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BULLETIN

DE LA

SOCIÉTÉ FOUAD I^er^ D'ENTOMOLOGIE

FONDÉE LE 1^er^ AOUT 1907

anciennement :
Société Entomologique d'Egypte (1907-1922)
et *Société Royale Entomologique d'Egypte* (1923-1937)

Placée sous le Haut Patronage du Gouvernement Egyptien
par Décret Royal en date du 15 Mai 1923

Année 1947

Tome 31

LE CAIRE
IMPRIMERIE PAUL BARBEY

1947

1er Août 1907 - 31 Juillet 1947

Volume
du Quarantième Anniversaire de la Fondation
de la Société Fouad Ier d'Entomologie

respectueusement dédié
a l'Auguste Mémoire
du Très Regretté Roi FOUAD Ier
Premier Patron de la Société

BULLETIN

DE LA

SOCIÉTÉ FOUAD Ier D'ENTOMOLOGIE

QUARANTIÈME ANNÉE

TRENTE-ET-UNIÈME VOLUME

1947

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1947

Les opinions émises dans les publications de la Société sont propres à leurs auteurs. La Société n'en assume aucunement la responsabilité.

Date de parution et de distribution du présent Volume :
31 Décembre 1947

Le Rédacteur en Chef :
A. ALFIERI

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DÉCRET DONNANT LE DE NOM
FOUAD PREMIER
A DES INSTITUTIONS PUBLIQUES CRÉÉES SOUS SES AUSPICES (¹)

Nous, FAROUK Ier, Roi d'Egypte,

Sur la proposition du Président de Notre Conseil des Ministres tendant à perpétuer le souvenir de feu le Roi Fouad Premier et à glorifier Son nom, vu que Son règne s'est distingué par des œuvres éminentes dans le domaine des réformes et par la création de maintes institutions publiques dont la réalisation s'est accomplie grâce à Ses conseils et à Sa sollicitude, ce qui a eu la plus grande influence sur l'orientation et le développement de la renaissance scientifique, littéraire, sociale et économique de l'Egypte;

Sur l'avis conforme de Notre Conseil des Ministres;

DECRETONS

Art. 1 — Le nom de Fouad Premier est donné aux institutions et établissements indiqués au tableau annexé au présent décret. (²)

Art. 2. — Le Président de Notre Conseil des Ministres est chargé de l'exécution du présent décret, qui entrera en vigueur dès sa publication au « Journal Officiel ».

Fait au Palais de Montazah, le 11 Gamad Tani 1357 (7 Août 1938).

FAROUK

Par le Roi :

Le président du Conseil des Ministres p.i.
Abdel-Fattah Yehia

(*Traduction*)

(¹) Extrait du *Journal Officiel* du Gouvernement Egyptien, Nº 94, du Jeudi 11 Août 1938.

(²) Parmi ces institutions et établissements, figure, sub 7 : *Société Fouad Ier d'Entomologie* **au lieu de** *Société Royale Entomologique d'Egypte.*

DÉCRET NOMMANT LE PRÉSIDENT DE LA SOCIETÉ FOUAD I^er^ D'ENTOMOLOGIE (1)

Nous, FAROUK Ier, Roi d'Egypte,

Vu le Décret du 15 Mai 1923 approuvant les Statuts de la Société Royale Entomologique d'Egypte (Société Fouad I^er^ d'Entomologie);

Sur la proposition du Président de Notre Conseil des Ministres et l'avis conforme du dit Conseil;

DECRETONS

Art. 1. — Mahmoud Tewfik Hifnaoui Bey, Ministre de l'Agriculture, est nommé Président de la Société Fouad I^er^ d'Entomologie.

Art. 2. — Le Président de Notre Conseil des Ministres est chargé de l'exécution du présent décret.

Fait au Palais d'Abdine, le 6 Moharram 1359 (14 Février 1940).

FAROUK

Par le Roi :
Le Président du Conseil des Ministres,
ALY MAHER

(Traduction)

---

(1) Extrait du *Journal Officiel* du Gouvernement Egyptien, 67^eme^ année, N° 18, du Lundi 19 Février 1940.

HAUTS PROTECTEURS DE LA SOCIÉTÉ FOUAD Ier D'ENTOMOLOGIE

Le Très Regretté Roi FOUAD Ier

et

Sa Majesté le Roi FAROUK Ier

MEMBRES BIENFAITEURS

1924

M. Moustapha Mourad El-Salanekli Bey, de Damanhour (Béhéra).

1925

S.E. El-Sayed Fathallah Mahmoud Pacha, de Rahmania (Béhéra); M. Riad Abdel-Kawi El-Gebali Bey, de Chebin-El-Kom (Menoufia); S.E. Georges Wissa Pacha, d'Assiout (Haute-Egypte); M. Yehia Kawalli Bey, de Minieh (Haute-Egypte); M. Yacoub Bibawi Attja Bey, de Minieh (Haute-Egypte); S.E. Hassan Charawi Pacha, de Minieh (Haute Egypte); S.E. Habib Chenouda Pacha, d'Assiout (Haute-Egypte); M. Mohamed Tewfik Hohanna Bey, de Tewfikieh (Béhéra); M. Hassan Ahmed Moussa Bey, de Minieh (Haute-Egypte); M. Labib Barsoum Hanna Bey, de Minieh (Haute-Egypte); S.E. Hassan Mohamed El-Tahtawi Pacha, de Guirgheh (Haute-Egypte); M. Kassem Osman El-Labban Bey, de Guirgheh (Haute-Egypte); M. Dordeir El-Sayed Ahmed El-Ansari Bey, de Guirgheh (Haute-Egypte); M. Barsoum Said Abdel-Messih Bey, de Minieh (Haute-Egypte); M. Dordeir Taha Abou-Gounema Bey, de Minieh (Haute-Egypte).

1926

M. Mohamed Rifaat El-Roznamgy Bey.

1927

M. le Dr. Walter Innes Bey (décédé en 1937); M. le Dr. Avocat Giovanni Ferrante (décédé en 1946).

1928

M. le Professeur Hassan C. Efflatoun Bey, du Caire; M. Hugo Lindeman (décédé en 1937).

1932

M. Alfred Reinhart (décédé en 1935).

Bull. Soc. Fouad Ier Entom., XXXI, 1947.

ORGANISATION ADMINISTRATIVE POUR L'ANNÉE 1947

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M. le Prof. Hassan C. Efflatoun Bey, *Vice-Président.*

M. Mohamed Soliman El-Zoheiry Bey, *Vice-Président.*

M. Anastase Alfieri, *Secrétaire-Général.*

M. Richard Wilkinson, *Trésorier.*

M. le Prof. Dr. Hamed Seleem Soliman Bey.

M. le Prof. Dr. Kamel Mansour.

M. le Dr. Assaad Daoud Hanna.

M. Abdel-Meguid El-Mistikawy.

M. Edgard Chakour.

M. le Dr. Mohamed Shafik Bey.

M. le Dr. Saadallah Mohamed Madwar.

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M. le Prof. Hassan C. Efflatoun Bey, M. le Prof. Dr. Hamed Seleem Soliman Bey, M. Mohamed Soliman El-Zoheiry Bey, M. le Prof. Dr. Kamel Mansour, M. Abdel-Meguid El-Mistikawy, M. le Dr. Saadallah Mohamed Madwar, M. Anastase Alfieri.

Censeurs

M. E. Kaourk et M. Elhamy Greiss.

LISTE DES MEMBRES

DE LA

SOCIÉTÉ FOUAD Ier D'ENTOMOLOGIE

EN 1947

(Les noms des Membres Fondateurs sont précédés de la lettre F)

Membres Honoraires

1908 Alluaud (Charles), Les Ouches à Crozant (Creuse), France.

1924 Ebner (Prof. Richard), 3, Beethovengasse, Vienne (X), Autriche.

1929 Peyerimhoff de Fontenelle (P. de), 87, Boulevard Saint-Saëns Alger, Algérie.

1908 Pic (Maurice), Les Guerreaux, par Saint-Agnan (Saône-et-Loire), France.

1940 Silvestri (Prof. F.), Ecole Supérieure d'Agriculture, Portici (Naples), Italie.

1943 Uvarov (Dr. B.P.), British Museum (Natural History), Londres, S.W. 7, Angleterre.

F Willcocks (F.C.), « Brambles », Hurst Lane, Sadlescombe (near Battle), Sussex, Angleterre.

Membres Correspondants

1932 Alfken (J.D.), 18, Delmestrasse, Brême, Allemagne.

1926 Hall (Dr. W.J.), c/o The Imperial Institute of Entomology, 41, Queen's Gate, London, S.W.7, Angleterre.

1924 Hindle (Prof. Dr. Edouard), Zoological Society of London, Regent's Park, London, N.W. 8, Angleterre.

1923 Hustache (A.), Pensionnat Saint-Laurent, Lagny (Seine-et-Marne), France.

1925 Kirkpatrick (Thomas Winfrid), The Imperial College of Tropical Agriculture, Trinidad, British West Indies.

1934 Koch (C.), (13 b), Gelting (Post Pliening), Obb. Bayern, Amerikanische Zone, Allemagne.

1929 Masi (L.), Museo Civico di Storia Naturale « Giacomo Doria », 9, Via Brigata Liguria, Genova (102), Italie.

Bull. Soc. Fouad Ier Entom., XXXI, 1947.

1934 Schatzmayr (A.), Museo Civico di Storia Naturale, 55, Corso Venezia, Milano, Italie.
1927 Williams (C.B.), Rothamsted Experimental Station, Harpenden, Herts, Angleterre.

Membres Titulaires

1913 Abaza Pacha (S.E. Fouad), Directeur Général de la Société Royale d'Agriculture, Boîte Postale N° 63, au Caire.
1943 Aboul-Nasr (Ahmed Emad El-Din), Démonstrateur au Département d'Entomologie, Faculté des Sciences, Université Fouad Ier, Abbassia, au Caire.
1908 Alfieri (Anastase), Secrétaire Général et Conservateur de la Société Fouad Ier d'Entomologie, Boîte Postale N° 430, au Caire.
1941 Amin El-Dib (Abdel-Latif), Faculté d'Agriculture, Université Farouk Ier, Damanhour, Basse-Egypte.
1943 Ammar (Mohamed Abdel-Guélil), Assistant Technique, Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.
1944 Atallah (Albert), Démonstrateur au Département d'Entomologie, Faculté des Sciences, Université Fouad Ier, 10, Sharia Masoud Baraka, Ard Raif, Choubrah, au Caire.
1938 Attia (Rizk), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.
1945 Azab (Dr. Ahmed Kamel), Département d'Entomologie, Faculté d'Agriculture, Université Fouad Ier, Sharia El-Madares, Ghizeh, près le Caire.
1938 Bailey Bros and Swinfen Ltd., 11, Ronalds Road, Highbury, London, N. 5, Angleterre.
1929 Bichara (Ibrahim), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.
1946 Bigio (Henri), Embassy Court, 11, Sharia Gabalaya, Ghézireh, au Caire.
1923 Bodenheimer (Prof. F.S.), Hebrew University, Jerusalem, Palestine.
1944 Brown (T.W.), Sharia Talaat, Ghizeh, près le Caire.
1938 Carneri (Alexandre), Librairie Elpénor, 10, Sharia Chakour Pacha, Alexandrie.
1929 Cassab (Antoine), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1923 Central Library, Research Division, Agriculture and Forests, Wad Medani, Soudan.

1943 Chaarawi (Ahmed Mounir), Assistant Technique, Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

F Chakour (Edgard), Secrétaire Général de la Société Anonyme des Eaux du Caire, Boîte Postale N° 55, au Caire.

1931 Compagnie Universelle du Canal Maritime de Suez (Monsieur l'Agent Supérieur de la), 20, Sharia Dar El-Chefa, Kasr El-Doubara, Boîte Postale N° 2120, au Caire.

1944 Coyne (Dr. F.P.), c/o Imperial Chemical Industries Ltd. (General Chemistry Division), Pest Control Section, Randle, Astmoor, Runcom, Cheshire, Angleterre.

1934 Crédit Foncier Egyptien (Monsieur l'Administrateur-Délégué), 35, Sharia El-Malika Farida, au Caire.

1944 Daira Draneht Pacha, Sarawella, par Kafr-Dawar, Basse-Egypte.

1938 Directorate-General of Agriculture, Ministry of Economics, Baghdad, Irak.

1928 Dollfus (Robert Ph.), Directeur de Laboratoire et de Recherches, Museum National d'Histoire Naturelle, 57, Rue Cuvier, Paris (Vme), France.

1919 Efflatoun Bey (Hassan C.), Vice-Doyen et Professeur d'Entomologie, Faculté des Sciences (Université Fouad 1er), 16, Sharia El-Cheikh Hamza, au Caire.

1946 El-Khishen (Shafik Aly), B.Sc., D.I.C., Ph. D., Faculté d'Agriculture, Université Farouk Ier, Damanhour, Basse-Egypte.

1947 Ezzat (Yehia Mahmoud), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Guizeh), près le Caire.

1944 Faculté d'Agriculture (Bibliothèque de la), Université Farouk Ier, Damanhour (Béhéra), Basse-Egypte.

1934 Faculté d'Agriculture, Université Fouad Ier, Sharia El-Madares, Ghizeh, près le Caire.

1946 Faculté de Médecine (Bibliothèque de la), Université Farouk Ier, Alexandrie.

1941 Fahmy (Aly), Section d'Entomologie, Ministère de l'Agriculture. Dokki (Ghizeh), près le Caire.

1945 Feinstein (Claude), Villa des Rosiers, Monpellier (Hérault), France.

1914 Garboua (Maurice), 1, Midan Soliman Pacha, au Caire.

1907 Garozzo (Arturo), Ingénieur Civil, 5, Sharia Champollion, au Caire.

1938 Ghabn (Dr. Abdel-Aziz), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1927 Ghali Pacha (S.E. Wacef Boutros), c/o S.E. Saba Habachi Pacha, 41, Sharia El-Malika Farida, au Caire.

1938 Ghesquière (J.), 87, Avenue du Castel, Bruxelles (W. St L.), Belgique.

1947 Ghibrial (Mounir), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1945 Green (J.) & Co., Département Agriculture, 147, Sharia Mohamed Bey Farid (ex Emad El-Dine), Boîte Postale N° 600, au Caire.

1921 Greiss (Elhamy), 215, Sharia El-Malika Nazli, au Caire.

1942 Habib (Abdallah), Professeur d'Entomologie à la Faculté d'Agriculture, Université Fouad 1er, Sharia El-Madares, Ghizeh, près le Caire.

1936 Hafez (Mahmoud), Ph. D., Département d'Entomologie, Faculté des Sciences, Université Fouad Ier, Abbassieh, au Caire.

1944 Hafez (Moustafa), Laboratoire des Insectes Parasites, Cotton Research Board, Ghizeh (Orman), près le Caire.

— Haires (R. Wheeler), M.B., D.Sc., F.Z.S., F.L.S., c/o Monsieur le Docteur Ibrahim Shawki Bey, Doyen de la Faculté de Médecine (Université Fouad Ier), Sharia Kasr El-Aïni, au Caire.

1938 Hamza (Soliman), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

» Hanna (Dr. Assaad Daoud), Gezira Research Farm, Wad Medani, Soudan.

1944 Hassan (Dr. Abbas Ibrahim), Département de Zoologie, Faculté des Sciences, Université Fouad Ier (Ghizeh, Orman), 80, Sharia Saleh El-Din, Héliopolis, près le Caire.

1945 Hassan (Dr. Ahmed Abdel-Gawad), Section d'Entomologie, Faculté d'Agriculture, Université Farouk Ier, Damanhour (Béhéra), Basse-Egypte.

1928 Hassan (Dr. Ahmed Salem), Professeur de Zoologie et d'Entomologie à la Faculté d'Agriculture, Université Fouad Ier, Sharia El-Madares, Ghizeh, près le Caire.

1944 Hassan (Mahrus Saleh), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1940 Hifnaoui Pacha (S.E. le Prof. Mahmoud Tewfik), Conseiller Technique du Ministère de l'Agriculture et Président de la Société Fouad Ier d'Entomologie, Sharia Lazogly, Hélouan, près le Caire.

1927 Housny (Mahmoud), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1943 Hussein (Mohamed), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1938 Ibrahim (Abdel-Hamid Ibrahim), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Guizeh), près le Caire.

1940 Ibrahim (Ahmed Housny), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1944 Imperial Chemical Industries (Egypt), S.A., 15, Midan Mohamed Aly, P.O. Bag, Alexandrie.

1936 Imperial Chemical Industries (Egypt), S.A., 26, Sharia Chérif Pacha, P.O.Bag, au Caire.

1928 Izzet Bey (Mohamed), 14, Midan El-Daher, au Caire.

1927 Kamal (Dr. Mohamed), Professeur d'Entomologie à la Faculté des Sciences (Université Farouk Ier), 7, Sharia Saïd Pacha, Gianaclis, Ramleh, Alexandrie.

1922 Kaourk (Elias A.), Avocat, c/o Egyptian Markets Company Ltd, 14, Sharia Emad El-Dine, au Caire.

1926 Kassem (Mohamed), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1943 Kefl (Ahmed Hassanein El-), Démonstrateur au Département d'Entomologie, Faculté d'Agriculture, Université Fouad Ier, Sharia El-Madares, Ghizeh, près le Caire.

1938 Klein (Dr. H.Z.), Agricultural Research Station, Boîte Postale N° 15, Rehovoth, Palestine.

1923 Laboratoires d'Hygiène Publique (Bibliothèque), Sharia El-Sultan Hussein, au Caire.

1931 Land Bank of Egypt (Monsieur l'Administrateur-Directeur), Boîte Postale N° 614, Alexandrie.

1944 Lean (Owen Bevan), Chief Locust Officer, B.M.E.O., 10, Sharia Tolumbat, au Caire.

1934 Lotte (Dr. F.), Médecin de la Compagnie Universelle du Canal Maritime de Suez, Boîte Postale N° 222, Port-Saïd.

1931 Lycées Français (Monsieur le Proviseur), 2-4, Sharia Youssef El-Guindi, au Caire.

1922 Madwar (Dr. Saadallah Mohamed), Directeur de la Section d'Eradication des Insectes, Ministère de l'Hygiène Publique, Sharia El-Falaki, au Caire.

1927 Mansour (Prof. Dr. Kamel), D. Sc., Département de Zoologie, Faculté des Sciences, Université Fouad Ier, Abbassieh, au Caire.

1947 Meymarian (Albert T.), Directorate of Agriculture, Baghdad, Iraq.

1943 Milad (Dr. Anis Boutros), Entomologiste attaché à la Section de Pathologie Animale (Département Vétérinaire du Ministère de l'Agriculture), 1, Sharia Yacoub, El-Dawawine, au Caire.

1921 Mistikawy (Abdel Megid El-), Société Royale d'Agriculture, Boîte Postale N° 63, au Caire.

1945 Moazzo (Polychronis Georges), 2, Sharia Young, Alexandrie.

1944 Morcos (Georges), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1929 Mosseri (Dr. Henri), 25, Sharia Talaat Harb Pacha, au Caire.

1947 Mougel (Henri), Professeur de Sciences Naturelles au Lycée Franco-Egyptien, Héliopolis, près le Caire.

1944 Moursi (Dr. Abdel-Fattah Aly), Laboratoire des Insectes Parasites, Cotton Research Board, Ghizeh (Orman), près le Caire.

1947 Nahas (Adnan), Ingénieur Agronome, Rue Maurice Barrès, Beyrouth, Liban.

1943 Nakhla (Naguib), Assistant Technique, Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1944 Nasr El-Sayed (Dr. Mahmoud), Microbiologiste aux Laboratoires Municipaux de Chimie et de Bactériologie, 8, Sharia Stanley Bay, Bulkeley, Ramleh.

1942 Okbi (Mahmoud Ismail El-), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1944 Palmoni (J.), Beth Gordon, Dagania A, P.O. Kinneret, Palestine.

1939 Pantos (Jean G.), Ingénieur Agronome, c/o Monsieur Nicolas Tsoumanis, Boîte Posatle N° 401, Elisabethville, Congo Belge

1944 Planta & C° (J.), Boîte Postale N° 450, Alexandrie.

1928 Priesner (Prof. Dr. H.), au Caire.

1947 Ramy (Farid), Ingénieur Agronome, Immeuble Makarem, Rue des Arts et Métiers, Beyrouth, Liban.

1942 Rawhy (Soheil Hussein), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1932 Rivnay (E.), P.O.Box 91, Rehovoth, Palestine.

1943 Rizkallah (Ramses), Assistant Technique, Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1925 Royal Entomological Society of London (The), 41, Queen's Gate, South Kensington, Londres, S.W. 7, Angleterre.

1947 Sagan (Jean), Zoologiste, 46, Sharia El-Mounira, au Caire.

1943 Samak (Mohamed Mohamed), Assistant Technique, Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1941 Sawaf (Saleh Kamel El-), Faculté d'Agriculture, Université Farouk Ier, Damanhour, Basse-Egypte.

1936 Sayed (Dr. Mohamed Taher El-), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1938 Shafik Bey (Dr. Mohamed), Directeur Technique de la Société Financière et Industrielle d'Egypte, Boîte Postale N° 7, Kafr-Zayat, Basse-Egypte.

1924 Shaw (Fred), Northgate, Sherborne, Dorset, Angleterre.

1943 Shehata (Ahmed Mohamed El-Tabey), Démonstrateur au Département d'Entomologie, Faculté d'Agriculture, Université Fouad Ier, Sharia El-Madares, Ghizeh, près le Caire.

1938 Société du Naphte, S.A. (A.I. Mantacheff & Co.), 33, Sharia Chérif Pacha, au Caire.

1921 Société Royale d'Agriculture, Laboratoire d'Entomologie de la Section Technique, Boîte Postale N° 63, au Caire.

1934 Soliman Bey (Prof. Dr. Hamed Seleem), Doyen de la Faculté d'Agriculture, Université Fouad Ier, Sharia El-Madares, Ghizeh, près le Caire.

1928 Soliman (Dr. Labib Boutros), Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

1946 Taher (Mahmoud), c/o J. de Planta & Co., 1, Sharia Baehler, Kasr El-Nil, Boîte Postale N° 424, au Caire.

1926 Tewfik (Mohamed), Chef de Laboratoire et Conservateur des collections entomologiques de la Faculté des Sciences, Université Fouad Ier, Abbassieh, au Caire.

1935 Tractor and Engineering Company, S.A.E. (The), 18, Sharia Emad El-Dine, Boîte Postale N° 366, au Caire.

1945 Triantaphyllidis (Nicolas P.), 12, Odos Admitou, Platia Attikis, Athènes, Grèce.

1946 Wahab (Abdel-Megid Abdel-), M.Sc., Démonstrateur au Département de Zoologie, Faculté des Sciences, Université Fouad Ier (Abbassieh), 2, Sharia El-Kholafa, Choubrah, au Caire.

1926 Waly (Dr. Mohamed), Conférencier en Zoologie, Faculté des Sciences, Université Fouad Ier, Abbassieh, au Caire

1947 Waterston (A.R.), Entomologiste Conseil du B.M.E.O., 10, Sharia Tolumbat, Garden City, au Caire.

1912 WILKINSON (Richard), Immeuble Baehler, 157, Sharia Fouad Ier, Zamalek, au Caire (Ouest).

1947 WILTSHIRE (E.P.), Premier Secrétaire d'Embassade et Consul de S.M. Britannique, 19, Sharia Gameh Charkas, au Caire.

1946 ZAAZOU (Dr. Hussein), Faculté d'Agriculture, Université Farouk Ier, Damanhour, Basse-Egypte.

1943 ZAKI (Mikhaïl), Section d'Entomologie, Musée Agricole Fouad Ier, Dokki (Ghizeh), près le Caire.

1944 ZERVUDACHI (Emmanuel), Boîte Postale No 1277, Alexandrie.

1938 ZOHEIRY Bey (Mohamed Soliman El-), Directeur de la Section d'Entomologie, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

Envois divers

Bibliothèque du Cabinet de SA MAJESTÉ LE ROI, Palais d'Abdine, au Caire.

Bibliothèque privée de SA MAJESTÉ LE ROI (Monsieur le Conservateur de la), Palais de Koubbeh, près le Caire.

Son Excellence le Grand Chambellan de Sa Majesté le Roi, Palais d'Abdine, au Caire.

Son Excellence le Président du Conseil des Ministres, au Caire.

Son Excellence le Ministre des Finances, au Caire.

Son Excellence le Ministre de l'Agriculture, Dokki (Ghizeh), près le Caire.

Son Excellence le Président de la Cour des Comptes, au Caire.

Son Excellence le Président du Conseil d'Administration de la Société Royale d'Agriculture, Boîte Postale N° 63, au Caire.

Monsieur l'Administrateur-Délégué du Crédit Foncier Egyptien, 35, Sharia El-Malika Farida, au Caire.

Son Excellence le Président du Conseil d'Administration de la Banque Misr, 151, Sharia Emad El-Dine, au Caire.

Monsieur le Directeur Général de l'Imperial Chemical Industries (Egypt), 26, Sharia Chérif Pacha, au Caire.

Monsieur le Directeur Général de la Société Financière et Industrielle d'Egypte, 2, Sharia Fouad Ier, Alexandrie.

Son Excellence le Sous-Secrétaire d'Etat, Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

Son Excellence le Secrétaire-Général du Ministère de l'Agriculture, Dokki (Ghizeh), près le Caire.

Bibliothèque Centrale de l'Université Farouk Ier, Palais Prince Omar Toussoun, Sharia Lumbroso, Moharrem Bey, Alexandrie.

Son Excellence l'Administrateur Général de la Khassa Royale, Palais d'Abdine au Caire.

Son Excellence le Directeur du Cabinet Européen de Sa Majesté le Roi, Palais d'Abdine, au Caire.

Bibliothèque du Ministère de l'Instruction Publique, Sharia El-Falaki, au Caire.

Bibliothèque Egyptienne, Midan Bab El-Khalq, au Caire.

Bibliothèque du Musée Agricole Fouad I^er^, Dokki (Ghizeh), près le Caire.

Nature, Macmillan and Co. Ltd., St. Martin's Street, London, W.C. 2, Angleterre.

Echanges

Afrique Occidentale Française

Institut Français d'Afrique Noire, Boîte Postale N° 206, Dakar.

Afrique du Sud

South African Museum, P.O. Box 61, Cape Town.

Department of Agriculture of the Union of South Africa (The Agricultural Journal of the Union of South Africa), Pretoria.

Department of Agriculture of the Union of South Africa, Division of Entomology, P.O. Box 513, Pretoria.

The Director, The Transvaal Museum, P.O. Box 413, Pretoria.

The Honorary Secretary, Entomological Society of Southern Africa, P.O. Box 103, Pretoria.

Algérie

Société d'Histoire Naturelle de l'Afrique du Nord, c/o Monsieur L. Faurel, Laboratoire de Botanique, Faculté des Sciences d'Alger, Alger.

Office National Anti-Acridien, Institut Agricole d'Algérie, Maison-Carrée, Alger.

Allemagne

Deutsche Entomologische Gesellschaft, 43, Invalidenstrasse, Berlin (IV).

Senckenbergischen Bibliothek, Senckenberg-Anlage 27, Frankfurt A/M.

Bücherei des Zoologischen Museums, 43, Invalidenstrasse, Berlin N 4.

Gesellschaft für Vorratsschutz E.V. (Mitteilungen der), 31, Zimmermannstrasse, Berlin-Steglitz.

Bücherei der Biologischen Anstalt für Land- und Forstwirtschaft, 19, Königin-Luise-Str., Berlin-Dahlem.

Deustches Entomologisches Institut der Kaiser Wilhelm Gesellschaft (Arbeiten über morphologische und taxonomische Entomologie, Arbeiten über physiologische und angewandte Entomologie), 20, Gossler Strasse, Berlin-Dahlem.

Deutsche Kolonial und Uebersee-Museum, Bahnhofsplatz, Brême.

Naturhistorischer Verein der Rheinlande und Westfalens (Entomologische Blätter, Decheniana), 4, Maarflach, Bonn.

Münchner Entomologischen Gesellschaft E.V. (Mitteilungen der), Menzingerstrasse 13, Zone Americaine, Munich 38.

Angleterre

The Imperial Institute of Entomology, Publication Office and Library (Review of Applied Entomology), 41, Queen's Gate, London, S.W. 7.

Zoological Museum (Novitates Zoologicæ), Tring Park, Tring, Herts.

The Apis Club (The Bee World), The Way's End, Foxton, Royston, Herts.

Cambridge Philosophical Society, New Museums, Free School Lane, Cambridge.

The Director, Anti-Locust Research Centre, British Museum (Natural History), London, S.W. 7.

The Librarian, The Zoological Society of London, Zoological Gardens, Regent's Park, London, N.W. 8.

The Librarian, Department of Entomology, University Museum, Oxford.

Argentine

Instituto Biologico de la Sociedad Rural Argentina, Buenos Aires.

Sociedad Cientifica Argentina, 1145, Calle Santa Fé, Buenos Aires.

Sociedad Entomologica Argentina, 267, Calle Maipu, Buenos Aires.

Museo Argentino de Ciencias Naturales « Bernadino Rivadavia », Casilla de Correo N° 10, Suc. 5, Buenos Aires.

Ministerio de Agricultura (Boletin del Ministerio de Agricultura de la Nacion), Bibliotheca, 974, Paseo Colon, Buenos Aires.

Instituto Miguel Lillo, Universidad National de Tucuman, Calle Miguel Lillo N° 205, Tucuman.

Australie

The Australian Museum (The Librarian), Sydney, N.S.W.

Council for Scientific and Industrial Research, 314, Albert Street, East Melbourne, C.2.

The Entomologist's Office, Department of Agriculture, Sydney, N.S.W.

The Public Library, Museum, and Art Gallery of South Australia, Box 386 A, G.P.O., Adelaide, South Australia.

The Library of the Division of Economic Entomology, P.O. Box N° 109, Canberra City, F.C.T.

The Linnean Society of New South Wales, Science House, Gloucester and Essex Streets, Sydney, N.S.W.

Autriche

Administration-Kanzlei des Naturhistorischen Museums, Burgring 7, Vienne (I).

Zoologisch-Botanische Gesellschaft, 2, Mechelgasse, Vienne (III).

Koleopterologische Rundschau, c/o Zoologisch-Botanische Gesellschaft, 2, Mechelgasse, Vienne (III).

Belgique

Société Entomologique de Belgique, Musée Royal d'Histoire Naturelle de Belgique, 31, Rue Vautier, Bruxelles, 4.

Société Scientifique de Bruxelles, Secrétariat, 11, Rue des Récollets, Louvain.

Bulletin de l'Institut Agronomique et des Stations de Recherches de Gembloux, Bibliothèque de l'Institut Agronomique de l'Etat, Gembloux.

Lambillionea, Revue Mensuelle Belge d'Entomologie, c/o M. Lucien Berger, 2, Vallée des Artistes, Linkebeek, Bruxelles.

Annales du Musée du Congo Belge, Tervuren.

Association des Ingénieurs sortis de l'Institut Agronomique de l'Etat, à Gembloux, 35, Avenue des Volontaires, Anderghem-Bruxelles.

Brésil

Museu National, Quinta da Boa Vista, Rio de Janeiro.

Instituto Biologico, Bibliotheca, Caixa 119-A, Sâo Paulo.

Instituto Oswaldo Cruz, Caixa de Correio 926, Rio de Janeiro.

Arquivos do Serviço Florestal, 1008, Jardim Botânico, Rio de Janeiro.

Academia Brasileira de Ciencias (Anais da Academia Brasileira de Ciencias), Caixa Postal 229, Rio de Janeiro.

Divisao de Intercambio e Documentacao, Fundaçao Getúlio Vargas, Praia de Botafogo, 186-92, Caixa Postal 4081, Rio de Janeiro.

Bulgarie

Institutions Royales d'Histoire Naturelle, Musée Royal d'Histoire Naturelle, Palais Royal, Sofia.

Société Entomologique de Bulgarie, Musée Royal d'Histoire Naturelle, Palais Royal, Sofia.

Société Bulgare des Sciences Naturelles, Musée Royal d'Histoire Naturelle, Palais Royal, Sofia.

Canada

Entomological Division, Science Service, Department of Agriculture, Ottawa, Ontario.

Bibliothèque du Ministère Fédéral de l'Agriculture, Edifice de la Confédération, Ottawa.

Entomological Division, Science Service, Department of Agriculture, Ottawa, Ontario.

Nova Scotian Institute of Science, Halifax.

Chine

The Lingnan Science Journal, Lingnan University, Canton.

Bulletin of the Biological Department, Science College, National Sun Yat-Sen University, Canton.

Bureau of Entomology of the Chekiang Province, West Lake, Hangchow.

Chypre

The Cyprus Agricultural Journal (The Office of the Governement Entomologist), Nicosia.

Colombie (République de), Amérique du Sud

Facultad Nacional de Agronomia (Biblioteca de la), Medellin.

Cuba

Sociedad Cubana de Historia Natural « Felipe Poey » (Memorias), c/o Dr. Carlos Guillermo Agnayo, 25 N° 254, Vedado, La Havane.

Danemark

Entomologisk Forening, Zoologisk Museum, Krystalgade, Copenhague.

Egypte

Ministère de l'Agriculture, Bibliothèque de la Section d'Entomologie, Dokki (Ghizeh), près le Caire.

Société Royale d'Agriculture, Bibliothèque de la Section Technique, Boîte Postale N° 63, au Caire.

Union des Agriculteurs d'Egypte, 25, Sharia Talaat Harb Pacha, au Caire.

The Bee Kingdom, 60, Sharia Menascé, Alexandrie.

Bibliothèque du Musée Agricole Fouad Ier, Dokki (Ghizeh), près le Caire.

Académie Egyptienne des Sciences (Monsieur le Secrétaire Honoraire de l'), Dar El-Hikma, 42, Sharia Kasr El-Aïni, au Caire.

Feuilles Agricoles, c/o Lycée Français, Chatby, Alexandrie.

Al-Fellaha, Boîte Postale N° 2047, au Caire.

Société Royale de Géographie d'Egypte, Bureau Postal de Kasr El-Doubara, au Caire.

The Journal of the Royal Egyptian Medical Association, Kasr El-Aini Post Office, au Caire.

Société Fouad Ier d'Economie Politique, de Statistique et de Législation, Boîte Postale N° 732, au Caire.

Institut d'Egypte, 13, Sharia El-Sultan Hussein, au Caire.

Bibliothèque de la Faculté des Sciences, Université Fouad Ier, Abbassieh, au Caire.

Equateur (République de l'), Amérique du Sud

Director General de Agricultura (Revista del Departamento de Agricultura), Quito.

Boletin de la Seccion Agricola del Banco Hipotecario del Ecuador, Apartado 685, Quito.

Espagne

Instituto Nacional de 2a Ensenanza de Valencia, Laboratorio de Hidrobiologia Espanola, Valencia.

Junta para ampliacion de Estudios e Investigaciones Cientificas, 4, Duque de Medinaceli, Madrid.

Eos, Revista Espanola de Entomologia, Instituto Espanol de Entomologia, Palacio del Hipodroma, Madrid (VI).

Real Academia de Ciencias y Artes de Barcelona, 9, Rambla de los Estudios, Barcelona (II).

Real Sociedad Espanola de Historia Natural (Biblioteca), Palacio de Bellas Artes, 84, Avenida del Generalisimo, Madrid.

Estacion Central de Fitopatologia Agricola, 17, Miguel Angel, Madrid (6).

Instituto de Ciencias Naturales, Museo Municipal de Ciencias Naturales, Apartado de Correos 593, Barcelone.

Etats-Unis

The Research Library, Buffalo Society of Natural Sciences, Buffalo Museum of Science, Humboldt Park, Buffalo, New-York.

University of Illinois Library, Exchange Division, Urbana, Illinois.

The Library, American Museum of Natural History, Central Park, West at 79th Street, New-York City.

The Ohio State University (The Ohio Journal of Science), Colombus 10, Ohio.

California Academy of Science Library (Pan-Pacific Entomologist), Golden Gate Park, San Francisco, 18, California.

Academy of Natural Sciences, Entomological Section, Lagon Square, Philadelphia.

Experiment Station of the Hawaiian Sugar Planters' Association, P.O. Box 411, Honolulu, T.H., Hawaii.

Hawaiian Entomological Society (The Secretary), 1527, Keeaumoku Street, Honolulu 4, Hawaii.

Carnegie Museum, Department of the Carnegie Institute, Pittsburgh, Pennsylvania.

American Entomological Society (The), 1900, Race Street, Philadelphia. 3, Penna.

United States Deparment of Agriculture Library, Washington, 25, D.C.

General Library, University of Michigan, Ann Arbor, Michigan.

United States National Museum, c/o Smithsonian Institution, Washington, D.C.

Smithsonian Institution Library, Washington, D.C.

New-York State College of Agriculture (The Library), Cornell University, Ithaca, New-York.

New-York Academy of Sciences, New-York.

Pennsylvania State Health Department, Pennsylvania.

University of California (The Library), College of Agriculture, Agricultural Experiment Station, Berkeley 4, California.

University of California, Citrus Experimental Station Library, Riverside, California.

Wisconsin Academy of Sciences, Arts, and Letters, 120, Wisconsin State Historical Building, Madison, Wisconsin.

The Library, Minnesota Agricultural Experiment Station, University Farm, Saint Paul, Minnesota.

Museum of Comparative Zoology, Harward College, Cambridge, Mass.

The Philippine Agriculturist (The Library of the College of Agriculture), Agricultural College, Laguna, Philippine Islands.

The Reading Public Museum and Art Gallery (The Librarian), Reading, PA.

Editorial Office, The American Midland Naturalist, University of Notre Dame, Notre Dame, Indiana.

Marine Biological Laboratory (The Library), Woods Hole, Mass.

The Library, State College of Washington, Agricultural Experiment Station, Pullman, Washington.

Finlande

Societas Entomologica Helsingforsiensis (Notulae Entomologicae), Museum Zoologicum, Helsingfors.

Societas pro Fauna et Flora Fennica, Kaserngatan 24, Helsinki.

Societas Zoologica-Botanica Fennica Vanamo, Säätytalo, Snellmaninkatu 9-11, Helsinki.

Société Entomologique de Finlande (Annales Entomologici Fennici), Institut de Zoologie Agricole et Forestière de l'Université, Snellmaninkatu 5, Helsinki.

France

L'Echange (Revue Linnéenne), Les Guerreaux, par Saint-Agnan (Saône et Loire).

Revue française d'Entomologie, Museum National d'Histoire Naturelle (Entomologie), 45 bis, Rue de Buffon, Paris (V^e).

Revue Scientifique du Bourbonnais et du Centre de la France, 22, Avenue Meunier, Moulins (Allier).

Société d'Etudes des Sciences Naturelles de Nîmes, 6, Quai de la Fontaine, Nîmes (Gard).

Société de Pathologie Végétale et d'Entomologie Agricole de France, Laboratoire de Pathologie Végétale, Institut National Agronomique, 16, Rue Claude Bernard, Paris (V^e).

Société Linnéenne de Bordeaux, Athénée, 53, Rue Des Trois Conils, Bordeaux.

Société Linnéenne de Lyon, 33, Rue Bossuet, Lyon (VI^e)

Société des Sciences Naturelles de l'Ouest de la France, Nantes (Loire Inférieure).

Association des Naturalistes de Levallois-Perret, 153, Rue du Président Wilson (Domaine de la Planchette), Levallois-Perret (Seine).

Société Linnéenne du Nord de la France, 81, Rue Lemerchier (M. Pauchet), Amiens.

Société Géologique de Normandie et des Amis du Museum du Havre, Hôtel des Sociétés Savantes, 56, Rue Anatole France, Le Havre (Seine Inférieure).

Société d'Histoire Naturelle de Toulouse (Monsieur P. Bonnet, Bibliothécaire de la), Faculté des Sciences, Toulouse.

Société Entomologique de France, Institut National Agronomique, 16, Rue Claude Bernard, Paris (V^e).

Société d'Etudes Scientifiques de l'Aude, Carcassone (Aude).

Annales des Epiphyties et de Phytogénétique, Centre National des Recherches agronomiques, à Versailles.

Museum National d'Histoire Naturelle, Bibliothèque, 8, Rue de Buffon, Paris (V^e).

Société de Zoologie Agricole (Revue de Zoologie Agricole et Appliquée), Faculté des Sciences, Institut de Zoologie, 40, Rue Lamartine, Talence (Gironde).

L'Entomologiste (Monsieur le Rédacteur en Chef de), Muséum National d'Histoire Naturelle, Entomologie, 45 bis, Rue de Buffon, Paris (V^e).

Rédaction du Bulletin Analytique, Service de Documentation du Centre National de la Recherche Scientifique, Ministère de l'Education Nationale, 45, Rue d'Ulm, Paris (V^e).

Institut des Fruits et Agrumes Coloniaux, 7, Rue Saint-Dominique, Paris (VII^e).

Grèce

Institut Phytopathologique Benaki, Kiphissia (près Athènes).

Bibliothèque de l'Institut et Musée Zoologique de l'Université, Athènes.

Hollande

Nederlandsche Entomologische Vereeniging (Bibliotheek van der), Zeeburgerdijk. 21, Amsterdam (O).

Landbouwhoogeschool, Laboratorium voor Entomologie, Berg 37, Wageningen.

Hongrie

Magyar Természettudomanyi Muzeum, 13, Baross-utca, Budapest.

Indes Anglaises

Zoological Survey of India (Records of the Indian Museum), Kaiser Castle, Benares Cautt.

Madras Governement Museum, Connemara Public Library, Egmore, Madras.

Office of the Director, Imperial Agricultural Research Institute, New Delhi.

Indes Néerlandaises

Den Directeur van's Lands Plantentium, Buitenzorg, Java.

Italie

Museo Civico di Storia Naturale « Giacomo Doria », 9, Via Brigata Liguria, Genova (102).

Rivista di Biologia Coloniale, 326, Viale Regina Margherita (Policlinico), Roma.

Museo Civico di Storia Naturale di Trieste (Atti del), 4, Piazza Hortis Trieste (10).

Società dei Naturalisti in Napoli, Università di Napoli, Via Mezzocannone, Napoli.

Società Entomologica Italiana, Museo Civico di Storia Naturale, 9, Via Brigata Liguria, Genova (102).

Società Adriatica di Scienze Naturali, 7, Via dell'Annunziata, Trieste.

La Stazione di Entomologia Agraria (Redia), 15-17, Via Romana, Firenze.

La Stazione Sperimentale di Gelsicoltura e Bachicoltura di Ascoli Piceno.

Istituto Zoologico dell'Università di Napoli (Biblioteca del), Via Mezzocannone, Napoli.

Laboratorio di Zoologia Generale e Agraria della Facolta Agraria, Portici (Napoli).

Laboratorio di Entomologia Agraria di Portici (Bolletino del), Portici (Napoli).

Institut International d'Agriculture (Bibliothèque de l'), Villa Umberto I, Rome.

Società italiana di Scienze Naturali, Palazzo del Museo Civico di Storia Naturale, Corso Venezia, Milano.

Istituto di Zoologia dell'Università di Genova (Bolletino dei Musei di Zoologia e di Anatomia comparata), 5, Via Balbi, Genova.

Società dei Naturalisti e Matematici di Modena, presso l'Università, Modena.

Istituto di Entomologia dell'Università, 6, Via Filippo Re, Bologna (125).

Accademia di Scienze, Lettere ed Arti in Padova, 15, Via Accademia, Padova (Veneto).

Museo di Storia Naturale della Venezia Tridentina (« Memoria del Museo di Storia Naturale della Venezia Tridentina » e « Studi Trentini di Scienze Naturali »), Casella Postale 95, Trento.

Istituto Agronomico per l'Africa (Rivista di Agricoltura subtropicale e tropicale), Ministero dell'Africa, 13, Via Fibonacci, Firenze.

Istituto di Entomologia Agraria e Bachicoltura dell'Università (Bolletino di Zoologia Agraria e Bachicoltura), 2, Via Celoria, Milano (133).

Società Veneziana di Storia Naturale (presso Sig. Antonio Giordani Soika), S. Marco 254, Venezia.

Japon

Saghalien Central Experiment Station, Konuma, Saghalien.

The Chara Institute for Agricultural Research, Library, Kurashiki, Okayama-Ken.

Imperial Agricultural Experiment Station (Journal of the), Nishigahara, Tokyo.

Department of Agriculture, Government Research Institute, Taihoku, Formosa.

The Kansai Entomological Society, c/o N. Tosawa, Shibakawa-Noen, Kotoen, Mukogun, Hyogo-ken.

« Mushii », Entomological Laboratory, Department of Agriculture, Kyushu Imperial University, Fukuoka.

Takeuchi Entomological Laboratory (Tenthredo, Acta Entomologica), Shinomyia Yamashina, Kyoto.

Kenya Colony (British East Africa)

East Africa Natural History Society (The Hon. Secretary), Coryndon Memorial Museum, P.O. Box 658, Nairobi.

Libye

Museo Libico di Storia Naturale, Piazza Santa Maria degli Angeli Tripoli d'Africa.

Maroc

Société des Sciences Naturelles du Maroc, Institut Scientifique Chérifien, Avenue Biarnay, Rabat.

Bureau de la Défense des Végétaux, 65 bis, Avenue de Témara, Rabat.

Mexique

Junta Nacional Directora de la Campana contra la Langosta (Junosta), Biblioteca, Departamento Directivo, Veracruz.

Biblioteca del Instituto Biotecnico, Calzada Mexico-Tacuba N° 295, Col. Anahuac, D.F.

Biblioteca del Instituto de Biologia, Chapultepec (Casa del Lago), Mexico, D.F.

Anales de la Escuela Nacional de Ciencias Biologicas, Apartado Postal 7016, Mexico, D.F.

Norvège

Tromso Museum Library, Tromso.

Panama (République de)

Departamento Seccional de Agricultura (Boletin Agricola), Panama.

Pologne

Musée Zoologique Polonais, ul. Wilcza N° 64, Varsovie.

Société Polonaise d'Entomologie (Bulletin Entomologique de la Pologne), ul. Sienkiewicza 21, Instytut Zoologiczny Uniwersytetu we Wroclawiu, Wroclaw.

Institut Polonais des Recherches Forestières (Instytut Badawczy Lesnictwa, Biblioteka), Al. Mickiewicza 25, Cracovie.

Porto-Rico

Institute of Tropical Agriculture, P.O. Box 1195, Mayagnez.

Portugal

Société Portugaise des Sciences Naturelles, Faculté des Sciences, Rue de l'Ecole Polytechnique, Lisbonne.

Museum Zoologique de l'Université de Coimbra, Largo Marquês de Pombal, Coimbra.

Associaçao da Filosofia Natural (Bibliotecario da), Faculdade de Ciencias, Porto.

Roumanie

Société Transylvanienne des Sciences Naturelles (Siebenbürgischer Verein für Naturwissenschaften), Hermannstadt, Sibiu.

Academia Romana, Bibliothèque, Calea Victoriei, 125, Bucarest.

Russie (U.R.S.S.)

Société Entomologique de Russie (Revue d'Entomologie de l'U.R.S.S.), Musée Zoologique de l'Académie des Sciences, Léningrad.

Bibliothèque de l'Académie des Sciences de l'Ukraine, 58a, Rue Korolenko, Kiew (Ukraine).

Société des Naturalistes de Kiew, 37-10, Rue Korolenko, Kiew (Ukraine).

Institut des Sciences Naturelles, Université M. Gorky, 1 ul. Genkelya, Zaimka, Molotov (Ourals).

Institute for Plant Protection, Bureau of Applied Entomology and Zoology, Library, 10, Elagin Ostrov, Léningrad.

Rédaction du Journal « Plant Protection », 7, Rue Tschaikovsky, Léningrad.

Institute for controlling Pests and Diseases, Library, 7, Rue Tschaikovsky, Léningrad 28.

Siam

Department of Agriculture and Fisheries, Entomology Section, Bangkok.

Suède

K. Swenska Vetenskapsakademien i Stockholm (Bibliotek), Stockholm 50.

Entomologiska Föreningen (Bibliothèque de l'), Stockholm, 50.

Göteborgs Kungl. Vetenskaps-och Vitterhets Samhälles, Göteborg.

Statens Växtskyddsanstalt, Stockholm 19.

Bibliothèque de l'Université de Lund, Lund.

Suisse

Bibliothèque de la Société Entomologique Suisse, Musée d'Histoire Naturelle, Berne.

Zentralbibliotek (Tauschabteilung), Naturforschenden Gesellschaft, Zurich.

Tchécoslovaquie

Societas Entomologica (Casopis), u Karlova 3, Prague II.

« Sbornik » (Acta Entomologica), Section de Zoologie du Musée National, Prague, II-1700.

Bibliothèque de la Société Zoologique Tchécoslovaque, Institut de Zoologie, Karlov 3, Prague II.

Uruguay (République de l')

Escuela de Veterinaria del Uruguay (Anales de la Escuela de Veterinaria del Uruguay), Itazaingo 1461, Montévideo.

Sociedad de Biologia de Montevideo, Casilla de Correo 567, Montevideo.

Yougoslavie

Societas Entomologica Jugoslavica (Glasnik), 17, Garasaninovo ulica, Belgrade.

Abonnements de la Société

Nature, Macmillan and C°, Ltd., St. Martin's Street, Londres, W.C.2, Angleterre.

Bulletin of Entomological Research, The Imperial Institute of Entomology, 41, Queen's Gate, S.W. 7, Londres, Angleterre.

PROCÈS-VERBAUX DES RÉUNIONS

Conférence du 1er Février 1947

Monsieur le Docteur Abdel Halim Badr Montasser : Les Cactées (en arabe).

Conférence du 4 Février 1947

Monsieur Abdel Aziz Abdellah Salem Bey, Sous-Secrétaire d'Etat à l'Agriculture : Dix jours dans la Péninsule du Sinaï (en arabe).

Conférence du 18 Février 1947

Monsieur le Docteur Ahmed Mohamed Meghahed : Une excursion botanique dans le Seddoud [Soudan] (en arabe).

Conférence du 19 Février 1947

Monsieur Naguib Nakhla : La lutte contre les sauterelles d'Egypte d'intérêt économique (en arabe).

Réunion du Conseil du 5 Mars 1947

Présidence de Monsieur Mohamed Soliman el-Zoheiry Bey,
Vice-Président.

Nécrologie :

Le Secrétaire Général a le regret de faire part de la mort du Professeur Guido Paoli, Directeur de l'Institut des Recherches Phytopatologiques de Gênes et Membre Correspondant de notre Société depuis 1934, décédé le 29 Janvier 1947.

Une minute de silence est observée en signe de deuil.

A la famille du défunt, aux Institutions scientifiques auxquelles il appartenait, la Société exprime ses condoléances et toute sa sympathie.

Echange des Publications :

Le Conseil approuve l'échange avec le Centre de Recherches Anti-Acridiennes de Londres, l'Institut d'Agriculture Tropicale de l'Université de Porto-Rico (Mayagnez), l'Institut des Fruits et Agrumes Coloniaux (Paris), l'Entomologiste (Paris), l'Académie Egyptienne des Sciences (Caire), le Service de Documentation du Centre National de la Recherche Scientifique (Paris).

Donations :

La Société a reçu L.Eg. 25 de l'Imperial Chemical Industries.

Le Conseil remercie.

Dons à la Bibliothèque :

Madame Veuve A. Petroff, d'Alexandrie, a fait parvenir six volumes sur l'Entomologie, édités en russe, en mémoire de son défunt époux.

Monsieur Marcello La Greca, de Naples, nous a adressé trois tirés à part de ses travaux sur les Orthoptères.

Monsieur le Professeur Filippo Silvestri, de Naples, fait don de trois tirés à part de ses récents travaux entomologiques.

Le Conseil remercie.

Contribution aux Collections :

Monsieur le Docteur J. Lewis du Service d'Entomologie Médicale de l'Institut des Recherches de la Ghezira (Soudan) fait don de quatre exemplaires d'*Anopheles gambiae* (2 ♂♂ et 2 ♀♀), ainsi que de quatre préparations sur lamelles de larves de l'insecte précité.

Le Conseil remercie.

Admission des Membres :

Sont admis à faire partie de la Société en qualité de Membres Titulaires : Messieurs T. Meymarian, du Directorat de l'Agriculture de Baghdad (Iraq), Farid Ramy et Adnan Nahas, de Beyrouth (Liban), présentés par Messieurs Mohamed Soliman El-Zoheiry Bey et A. Alfieri ; Monsieur Jean Sagan, présenté par Messieurs R. Wilkinson et A. Alfieri.

Rapport Annuel :

Le Conseil approuve la teneur des Rapports du Secrétaire Général, du Trésorier et des Censeurs pour l'Assemblée Générale Ordinaire dont la date est fixée au 26 Mars 1947.

Conférence du 11 Mars 1947

Monsieur le Docteur Mohamed Kamel Barrada : Les récentes méthodes scientifiques utilisées contre la propagation des maladies syphilitiques (en arabe).

Assemblée Générale Ordinaire
du 26 Mars 1947

Présidence
de Monsieur MOHAMED SOLIMAN EL-ZOHEIRY Bey, *Vice-Président.*

Rapport du Secrétaire Général (Exercice 1946) :

Messieurs,

Aux termes des Articles 24, 25 et 26 de nos Statuts, nous vous avons convoqués en Assemblée Générale Ordinaire pour vous présenter les Rapports du Secrétaire Général, du Trésorier et des Censeurs sur la situation morale, financière et comptable de la Société, pour donner au Conseil décharge de sa gestion, et pour procéder, par voie d'élections, au remplacement des Membres sortants du Conseil, et des deux Censeurs des comptes de l'Exercice en cours.

Tout d'abord disons que durant l'Exercice clos, Sa Majesté le Roi Farouk I^er^ a bien voulu conférer des grades et des décorations à plusieurs de nos membres, témoignant ainsi de Sa haute sollicitude envers des techniciens qui contribuent au progrès scientifique de Son merveilleux Pays. Que Sa Majesté daigne trouver ici l'humble hommage de leur inaltérable dévouement et de leur immense gratitude.

Signalons aussi le sincère et cordial hommage de sympathie envoyé d'Alger par Monsieur P. de Peyerimhoff de Fontenelle, ancien Président de la Société Entomologique de France et Membre honoraire de notre Société, et ainsi conçu :

« J'ai lu dans vos Bulletins les Procès-Verbaux de vos Réunions et le Compte-Rendu de la visite de Sa Majesté le Roi Farouk I^er^ à la Société. J'ai remarqué les témoignages de bienveillance qu'Il vous a donnés à cette occasion et je me réjouis avec vous de l'intérêt que Sa Majesté veut bien porter à la Société ».

Nous remercions Monsieur de Peyerimhoff et nous le prions d'agréer l'assurance de nos sentiments les meilleurs et les plus sincères.

C'est avec profond regret que nous avons appris le décès de dix de nos Membres. Ce sont le Major Stanley Smith Flower, Robert du Buysson, le Docteur Paul Marchal, l'Abbé O. Parent et le Docteur Joseph Villeneuve, membres honoraires ; le Docteur Auguste Cros et Henri Gadeau de Kerville, membres correspondants ; le Docteur Ange-Marie Honoré, le Docteur A. Azadian et Alexandre Petroff, membres titulaires de la Société.

Nous réitérons nos sentiments de condoléance et toute notre sympathie aux familles des défunts, ainsi qu'aux Institutions scientifiques auxquelles ils appartenaient.

Nous vous proposons de suspendre la séance quelques instants et d'observer deux minutes de silence pour honorer leur mémoire.

Le Ministère de l'Agriculture nous a fait parvenir 1000 livres égyptiennes représentant la subvention arriérée 1945, ainsi que 1000 livres égyptiennes montant de la subvention pour l'année 1946. Nous adressons au Ministère de l'Agriculture tous nos remerciements et l'expression de notre profonde gratitude pour sa constante sollicitude envers notre Société.

Citons encore, avec gratitude, les donations qui nous ont été faites par la Société Royale d'Agriculture, le Crédit Foncier Egyptien, la Banque Misr, l'Imperial Chemical Industries, le Ministère des Wakfs et la Société Financière et Industrielle d'Egypte, de livres égyptiennes 50, 50, 25, 25, 20 et 15 respectivement.

Des conférences publiques ont été données par nos Membres.

Des techniciens du Ministère de l'Agriculture, des professeurs et un grand nombre d'étudiants des Facultés des Sciences et d'Agriculture des Universités Fouad I^{er} et Farouk I^{er}, ont fréquenté notre Bibliothèque ou bien obtenu les déterminations de leurs insectes. Nous avons également identifié des insectes des collections de l'Institut Supérieur d'Agriculture de Chebin El-Kom.

Sur la demande du Ministère de l'Agriculture, Monsieur Fathy Mohamed Shalaby, de la Section Entomologique du Ministère précité, a suivi à la Société, quatre mois durant, des cours d'entomologie systématique.

Divers groupements scolaires ont visité notre Musée et y ont reçu toutes les explications utiles.

Le régistre de notre Bibliothèque accuse 15495 ouvrages et brochures, contre 14784 l'année précédente, soit en augmentation de 711 unités. Nos acquisitions les plus importantes sont les suivantes : 10 fascicules des Genera Insectorum, 13 volumes de l'Encyclopédie Entomologique de Paul Lechevalier, les volumes 52-56 de l'Entomologische Rundschau, la Monographie des Chrysidides publiée par A. Mocsary en 1889, les fascicules 168-170 du Coleopterorum Catalogus de Junk, et les volumes 2-10 et 16-26 du Deutsche Entomologische Zeitschrift « Iris ». En outre, 236 volumes ont pu être reliés.

Notre Bulletin pour l'année 1946 contient 14 études originales émanant de Messieurs M. Aschner, le Docteur Taher Sayed, E. Rivnay, le Docteur A. A. Moursi, le Docteur Mohamed Kamal, J. Barbier, Geoffrey C. Price, A. Alfieri, et Mohamed Hussein.

Votre Trésorier a établi le Bilan des Comptes du trente-neuvième Exercice social, dûment vérifié et approuvé par vos Censeurs, ainsi que les Prévisions budgétaires pour l'Exercice 1947. L'excédent des recettes sur les dépenses est de livre égyptienne une et cent dix millièmes.

Aux termes de l'Article 13 de nos Statuts, le Conseil est annuellement renouvelé par tiers. Les membres sortants cette année sont les suivants : Messieurs le Professeur H. C. Efflatoun Bey, le Professeur Docteur Kamel Mansour, le Docteur Saadallah Mohamed Madwar, et A. Alfieri. Ils sont rééligibles.

Vos Censeurs, Messieurs E. A. Kaourk et Elhamy Greiss, sont également rééligibles.

En terminant, nos pensées sont respectueusement dédiées à notre auguste et bien-aimé souverain, Sa Majesté le Roi Farouk I^{er}, et nous Lui exprimons nos sentiments de profond dévouement et nos vœux les plus fervents

Signé : A. ALFIERI.

Rapport du Trésorier :

Bilan au 31 Décembre 1946

DÉPENSES	L.E.	MM.	RECETTES	L.E.	MM.
Entretien Bâtiment	105	000	Subvention Ministère Agriculture (années 1945 et 1946)	1995	990
Impôts et Assurances	62	816	Donations	184	845
Frais Généraux	294	510	Cotisations des Membres	100	835
Personnel	1042	800	Droits d'Inscriptions	1	000
Publications	370	498	Intérêts de Banque	22	077
Bibliothèque	161	778	Coupons Emprunt National	583	520
Ristourne Subvention 1945	997	995	Vente Publications	2	500
Excédent de l'Exercice 1946	1	110	Encaissements divers	145	740
	3036	507		3036	507

Inventaire

ACTIF	L.E.	MM.	PASSIF	L.E.	MM.
Immeuble Social	1	000	Réserve Générale	15905	501
Mobilier	1	000			
Bibliothèque	1	000			
Collections	1	000			
Laboratoires	1	000			
Banque Nationale d'Egypte	2708	242			
Portefeuille Emprunt National	13187	630			
Compagnie du Gaz	4	629			
	15905	501		15905	501

Portefeuille Titres en dépôt à la Banque Nationale d'Egypte : 18000 L.Eg. Emprunt National 3 ¼ % (1963-1973).

Signé : R. WILKINSON.

Rapport des Censeurs :

En exécution du mandat que vous avez bien voulu nous confier, nous avons l'honneur de porter à votre connaissance que nous avons vérifié les Comptes de la Société Fouad Ier d'Entomologie pour l'année finissant le 31 Décembre 1946, avec les régistres et documents y rélatifs.

Nous certifions que le Bilan reflète d'une façon exacte et sincère la situation de la Société telle qu'elle ressort des régistres et des explications qui nous ont été données.

Signé : E. A. Kaourk et Elhamy Greiss.

Prévisions Budgétaires pour l'année 1947 :

RECETTES			DÉPENSES		
	L.E.	MM.		L.E.	MM.
Subvention Ministère Agriculture	1000	000	Loyer	1	000
Donations	185	000	Impôts	36	000
Cotisations des Membres	100	000	Assurances	27	000
Coupons Emprunt National	583	000	Frais Généraux	250	000
Intérêts de Banque	22	000	Entretien	50	000
Vente Publications	5	000	Personnel	1043	000
Prélèvement sur capital	55	000	Publications	450	000
			Bibliothèque	60	000
			Imprévus	33	000
	1950	000		1950	000

Signé : R. Wilkinson.

Décisions :

1) Le Procès-Verbal des décisions prises à l'Assemblée Générale Ordinaire du 27 Mars 1946 est lu et confirmé.

2) Les Rapports du Secrétaire Général, du Trésorier et des Censeurs pour l'Exercice 1946, ainsi que les Prévisions Budgétaires pour l'Exercice 1947, sont lus et approuvés.

3) L'Assemblée donne décharge au Conseil de sa gestion pour l'Exercice 1946.

Elections :

Messieurs le Professeur H. C. **Efflatoun** Bey, le Professeur Docteur **Kamel Mansour**, le Docteur **Saadallah Mohamed Madwar** et **Anastase Alfieri**, membres du Conseil sortants, sont réélus pour trois ans.

Messieurs E. A. **Kaourk** et **Elhamy Greiss** sont réélus Censeurs des Comptes de la Société pour l'Exercice 1947.

Remerciements :

Avant de se séparer, l'Assemblée Générale Ordinaire vote une motion de remerciements à l'adresse de Messieurs le Secrétaire Général, le Trésorier, les Membres du Conseil, les Censeurs, et de toutes les personnes ou institutions qui par leurs dons, leurs contributions et leur sympathie constante ont aidé la Société à remplir sa tâche durant l'éxercice écoulé.

Conférence du 31 Mars 1947

Monsieurs le Docteur **Ibrahim Raghab Fahmy** : Le hachiche comparé à l'alcoolisme (en arabe).

Visite du II Avril I947

Les élèves du Département de Zoologie de la Faculté des Sciences (Université Farouk I^er^), accompagnés de leurs professeurs, ont visité les différentes sections de la Société.

Conférences de l'Association Egyptienne pour l'Avancement des Sciences

19 Avril 1947 : Economie et politique dans le monde d'aujourd'hui, par Monsieur **Mahmoud Darwiche** Bey (en arabe).

21 Avril 1947 : Directives relatives à notre politique agricole, par Son Excellence **Hussein Enan** Pacha (en arabe).

23 Avril 1947 : La nécessité des Instituts de Recherches Agricoles et Industrielles en Egypte, par Monsieur le Docteur **Ahmed Riad** Bey (en arabe).

24 Avril 1947 : L'organisation de l'Instruction dans le monde après la guerre, par Monsieur le Professeur **Ismail El-Kabbany** Bey (en arabe).

Visite du 26 Avril 1947

Les élèves de l'Ecole Secondaire de Jeunes Filles de Mansourah, accompagnées par leurs professeurs, ont visité la Société et y ont reçu toutes les explications utiles.

Commémoration du Onzième Anniversaire de la mort du Roi Fouad Ier

(28 Avril 1947)

Comme chaque année, les membres du Conseil d'Administration de la Société se sont rendus à la mosquée d'El-Rifaï pour déposer une couronne sur la tombe royale et rendre hommage à la mémoire du Grand Souverain disparu. Après avoir salué Sa Majesté le Roi Farouk Ier, ils furent s'inscrire sur les registres du Palais d'Abdine.

Réunion du Conseil du 30 Avril 1947

Présidence de Monsieur MOHAMED SOLIMAN EL-ZOHEIRY Bey,
Vice-Président.

Dons à la Bibliothèque :

Monsieur JACQUES DE BEAUMONT, Conservateur du Musée Zoologique de Lausanne, fait parvenir 13 tirés à part de ses travaux sur les hyménoptères, publiés de 1937 à 1947.

Le Conseil remercie.

Echange des Publications :

Le Conseil approuve l'échange avec les Institutions ci-après :

FEUILLES AGRICOLES, publiées par le Lycée Français de Chatby, Alexandrie.

ACTA ZOOLOGICA LILLOANA, publiés par l'Instituto Miguel Lillo de l'Université Nationale de Tucuman, Argentine.

The OHIO JOURNAL OF SCIENCE, publié par l'Université de l'Etat de l'Ohio, Colombus, Etats-Unis d'Amérique.

Admission d'un Membre :

Monsieur A. R. WATERSTON, entomologiste Conseil du B.M.E.O. du Caire, est admis à faire partie de la Société en qualité de Membre Titulaire, présenté par Messieurs MOHAMED SOLIMAN EL-ZOHEIRY Bey et ABDEL MEGUID EL-MISTIKAWY.

Bureau du Conseil pour l'Exercice 1947 :

Sont réélus : Messieurs le Professeur H. C. EFFLATOUN Bey et MOHAMED SOLIMAN EL-ZOHEIRY Bey, *Vice-Présidents ;* Monsieur ANASTASE ALFIERI, *Secrétaire Général ;* Monsieur RICHARD WILKINSON, *Trésorier.*

Comité Scientifique :

Sont réélus : Messieurs le Professeur H. C. EFFLATOUN Bey, MOHAMED SOLIMAN EL-ZOHEIRY Bey, le Professeur Docteur HAMED SELEEM SOLIMAN

Bey, le Professeur Docteur Kamel Mansour, le Docteur Saadallah Mohamed Madwar et Anastase Alfieri. Monsieur Abdel Meguid El-Mistikawy est élu en remplacement de Monsieur le Docteur Assaad Daoud Hanna, résidant actuellement au Soudan.

Anniversaire de l'Avènement au Trône de Sa Majesté le Roi Farouk Ier
(6 Mai 1947)

A l'occasion de l'Avènement au Trône de Sa Majesté le Roi Farouk Ier, les Membres du Conseil de la Société ont adressé une dépêche de félicitations à Son Excellence le Grand Chambellan, et se sont inscrits sur les régistres royaux du Palais d'Abdine.

Conférence du 13 Mai 1947

Monsieur le Professeur Moustafa Amer Bey : L'Egypte et ses obligations en Afrique après la guerre (en arabe).

Conférence du 16 Juin 1947

Sur l'invitation de la Société, Monsieur le Profésseur Francesco Scandone, de l'Université de Florence et de passage au Caire, a donné une conférence sur une invention destinée à révolutionner la technique des recherches microscopiques.

Il s'agit d'une nouvelle méthode qui apporte une aide considérable dans le champ de la biologie et de la médecine appliquée en général. Le procédé de la « Microscopie des Phases » dispense l'investigateur de colorer les préparations à examiner, facilitant ainsi grandement le travail de laboratoire. Les recherches microscopiques sont faites à l'aide d'un microscope spécial permettant la vision optique et photographique par l'utilisation des déplacements de phase introduits dans le rayon lumineux qui éclaire l'objet Monsieur le Professeur Francesco Scandone a illustré sa Conférence par des projections démontrant les résultats étonnants obtenus grâce à ce nouveau système. Le public, presque entièrement composé de Professeurs et de Docteurs des Universités égyptiennes et étrangères, a chaleureusement applaudi le brillant conférencier.

Réunion du Conseil du 17 Décembre 1947

Présidence de Monsieur le Professeur H. C. Efflatoun Bey,
Vice-Président.

Nécrologie :

Le Secrétaire Général a le regret d'annoncer le décès des regrettés collègues dont les noms suivent :

André Théry, membre honoraire de la Société depuis 1929, spécialisé dans l'étude des Buprestides, auteur de nombreux travaux sur les espèces égyptiennes de cette famille, publiés dans nos Bulletins.

Jacques Hervé-Bazin, de Laval (Mayenne), France, membre correspondant de la Société depuis 1923, spécialiste en Diptères, auteur de plusieurs articles sur la faune égyptienne, publiés dans nos Bulletins.

A. d'Orchimont, de Bruxelles, membre correspondant de la Société depuis 1928, qui a publié dans nos Bulletins diverses études sur nos Hydrophilides.

Une minute de recueillement est observée en signe de deuil.

Aux familles des défunts, aux Institutions scientifiques auxquelles ils appartenaient, notre Société exprime ses condoléances et sa sympathie.

Donations :

La Société a reçu L.Eg. 50 de la Société Royale d'Agriculture et L.Eg. 50 du Crédit Foncier Egyptien, à titre de subvention pour l'année 1947.

Le Conseil remercie.

Dons à la Bibliothèque :

La Bibliothèque du Service d'Informations des Etats-Unis nous a fait parvenir les volumes 35-39, années 1942-1946, du « Journal of Economic Entomology ».

La Société Linéenne de Lyon nous a adressé les volumes 61-66, 68, 70 et 73 de ses Annales, ainsi qu'un grand nombre de fascicules de ses Bulletins mensuels et bi-mensuels.

Monsieur le Professeur Ahmed Salem Hassan a fait don de son ouvrage « Les insectes nuisibles d'Egypte », édition 1947, publié en arabe.

Monsieur A. Alfieri fait don des ouvrages ci-après : Les maladies des plantes cultivées et leur traitement, par le Docteur Henry Faes, Lausanne, 1923 ; Précis d'Histoire Naturelle, par A. Pizon, Paris, 1923 ; Précis de Parasitologie, par E. Brumpt, Paris, 1927.

Le Conseil remercie.

Admission de Membres :

Messieurs Yehia Mahmoud Ezzat, Ahmed Ibrahim Ezz et Mounir Ghibrial, de la Section d'Entomologie du Ministère de l'Agriculture et présentés par Messieurs Mohamed Soliman El-Zoheiry Bey et Antoine Cassab, et Monsieur R. Wheeler Haires, Professeur d'Anatomie à l'Hôpital Demerdache, présenté par Messieurs H. C. Efflatoun Bey et A. Alfieri, sont admis à faire partie de la Société en qualité de Membres Titulaires.

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Middle East Lepidoptera, VI:

TWO FINE NEW SPECIES FROM SOUTHERN SINAI

(with 1 coloured Plate)

by E. P. Wiltshire, F.R.E.S.

Previous articles in this taxonomic series (1), have dealt with new species and forms from Iraq and Iran. It might be thought that the Egyptian Lepidoptera, at least the « Macrolepidoptera », have already been all described, but this is not the case. In particular the expedition to S. Sinai organised by the Faculty of Science, Fuad I University, Cairo, in spring 1940 (2), resulted in the addition to the collections of Cairo of various new species of Lepidoptera, two of which are now described. Others will be described later in due course.

It seems right and proper that these two handsome species should be named in honour of the Society's Royal Protector, and of its late Royal first Patron respectively, and that they should be introduced to the public in the Fortieth Anniversary number of the Society's Bulletin.

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(1) Owing to certain editorial errors, for which the author is not responsible, it is necessary to recapitulate the titles of these previous articles : (1) New Lepidoptera from S.W. Iran, *Journ. Bombay Nat. Hist. Soc.*, XLIII (Aug. 1941); (2) Some more new Lepidoptera from S.W. Iran with their life histories, *ibid.*, XLIV (Dec. 1943); (3) Middle East Lepidoptera, New Forms and Species, III (misprinted VI), *Ent. Rec. and Journ. of Var.*, LVI (Nov. 1944); (4) Middle East Lepidoptera, IV (misprinted VII), *ibid.*, LVIII (March 1946); (5) Middle East Lepidoptera, V, *Proc. R. Ent. Soc. London* (B), XV (Parts 9-10 [Oct. 15. 1946]).

(2) A preliminary account of the expedition, with a description of the biotope and the mention of 4 Lepidoptera not known before from Sinai, has been given by Mr. A. Alfieri in *Bull. Soc. Fouad I Ent.*, XXVI, 1942.

LIMACODIDAE

Coenobasis Farouki spec. nov.

(Plate, fig. 1)

Palp, pale orange, black laterally towards base.

Legs, orange and pale orange, with black spines and claws and a few black hairs.

Antenna, orange-brown.

Tips of thoracic collar, and of tegulae (patagia-tufts), orange. Similar pairs of orange tufts on first two abdominal tergites. Thorax and forewing, pale green. Hindwing and abdomen, pale yellow. Fringes, pale yellow, with black spots at their base, 8 on the forewing and 7 on the hindwing, marking the nervures on the termen. Only three of the hindwing ones are really dark black.

Underside, forewing, whitish, orange-brown or brown towards costa; hindwing, pale yellow. Fringes, both wings, as upper-side.

Span : 21-28 mm.

Holo-, allo-, and para-Types : Jebel Katherina, various heights between 600 and 1500 metres, S. Sinai, April 1940, leg. Alfieri. In coll. Alfieri except for one paratype in my collection.

The first Palaearctic *Coenobasis* (a genus hitherto known only from Tropical Africa), is a new species close to *Coenobasis postflavida* Hamps. of the Sudan and Eritrea, from which it differs in its pale green, not blue-green, forewing, the absence of any green terminal suffusion on the hindwing, and particularly in the absence of green and black bands from the foreleg.

AGROTIDAE

Anydrophila Fouadi spec. nov.

(Plate, fig. 2)

Frons, smooth. Palp and frons, with white and a few brown or black scales.

Forewing, white, more or less heavily powdered with blue-grey or ochreous scales, the latter being local, the former often general but always present in the submarginal area. Nervures, black in crossing this area. Two dark very irregular fasciae enclose a median area usually darker that the rest of the forewing. This area is cut into two unequal parts by the fasciae meeting below the cell and again on nervure 1. A reddish-ochreous obsolete diffuse line runs parallel outside the postmedian fascia. A dark linear subapical streak between nervures 6 and 7 runs from the most distal point of the postmedian line upwards to the termen, which is marked between the nervures with dusky distally white crescents. Fringes, dark grey.

Hindwing, ochreous white; submarginal band, broad, heavy, diffuse, blackish, leaving a whitish apical patch. Fringes, white, interrupted with black on nervures 2-6.

Underside, both wings whitish with a broad diffuse black band, submarginal on forewing, marginal on hindwing.

Span : 31-36 mm.

Holo-Type : ♂, 10 April 1940, Karm Alam, S. Sinai, 680 m. In coll. Alfieri.

Allo-Type : ♀, 13 April 1940, Bir Isla, S. Sinai, 390 m. In coll. Alfieri.

Para-Types : both sexes, various camping places 390-1430 m., Jebel Katherina, S. Sinai, 6-14 April 1940. In coll. Alfieri, except for one Para-Type in my collection.

E. P. WILTSHIRE

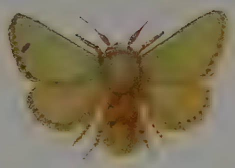

Fig. 1: *Coenobasis Farouki* spec. nov., × 1.25.

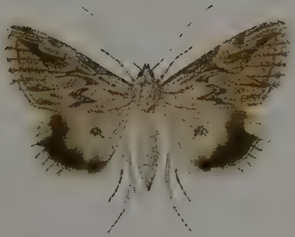

Fig. 2: *Anydrophila Fouadi* spec. nov., × 1.25.

B. ASSAAD PINX.

Middle East Lepidoptera, VII⁽¹⁾:

NEW SPECIES AND FORMS FROM EGYPT AND ARABIA

(with 11 Text-Figures and 1 Plate)

by E. P. WILTSHIRE, F.R.E.S.

Three of the Lepidoptera here described are from the Tropical, the others from the Palearctic (Sub-Tropical) Middle East. The Egyptian material is in the Alfieri collection, Cairo; the Arabian material was kindly sent me by Dr. B.P. Uvarov, C.M.G., and represents part of the collections made by the Anti-Locust Units in Arabia in 1944-46.

In addition to my colleagues and correspondents mentioned in earlier articles in this taxonomic series, I am also indebted to Mr. W. Brandt and Mr. R. J. Collins for helpful opinions by letter.

The photographs show these forms, where illustration is considered necessary, life size; the drawings of genitalia were made with a *camera lucida* at × 30 and are reproduced at × 15.

LASIOCAMPIDAE

Lambessa gibbonsi spec. nov.

(Plate Fig. 1)

Eye, black, surrounded with black silky hairs.

Frons and palp, with orange-brown silky hairs.

Antennae, same proportionate size as in *pungeleri;* yellow-brown.

Legs, and costa, yellow-brown.

Rest of head, body and wings, pure satin-white, except for a slight fuscous infusion towards the base of the forewing underside.

Span: 38 mm.

Holo-Type: ♂, leg. Gibbons, 30.I.46, Hail (Arabia). Will be deposited in British Museum.

This form is quite unlike the nearest congener (*L. pungeleri* Stertz. = *albescens* Roths.) in colour, being smaller and prevailingly satin-white. It might however only be a race thereof, analogous with the pure white *Chon-*

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(1) The immediately preceding article in this series appears on page 1.

drostega from Arabia, which is doubtless an extreme desert form of *C. aurivillii feisali* Wilts., and with *Holcocerus holosericeus* Stgr. of the Central Asian deserts.

AGROTIDAE

Zenobiinae (Caradrininae)

Caradrina (subgenus Paradrina) katherina spec. nov.

(Fig. 1, and Plate Figs. 2-3)

Palp, with brown and black scales, especially on joint 2.

Antenna, lightly ciliate.

Forewing and abdomen, yellowish grey, with the following darker grey markings : four costal specks; ante-median line at right-angles to costa, irregular; orbicular stigma, a small spot; reniform stigma, not always distinct but when clear a double crescent, darker-edged with paler spots on proximal and distal sides; median shade, sometimes a distinct fascia; postmedian line, proceeding from last costal speck just above reniform stigma, curving widely round the latter, denticulate, more or less parallel to margin. Submarginal line, interrupted, pale; submarginal shade, dark grey. Fringes, yellow-grey, darker-chequered.

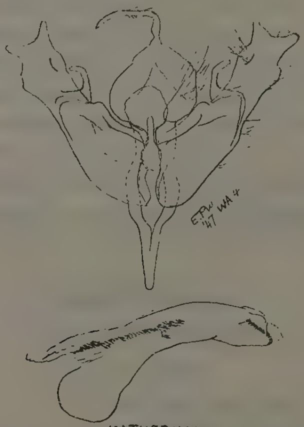


Fig. 1 : Ventral open view of ♂ genitalia of *Caradrina katherina* spec. nov., with aedeagus separated.

Hindwing, whitish-transparent, iridescent, as in *Laphygma exigua;* darker towards termen which is greyish brown; nervures lightly indicated near termen.

The sexes are alike.

The male genitalia (Fig. 1) are distinctive. In facies the moth is easily confused with the widespread *Caradrina* (*Paradrina*) *clavipalpis* Scop., of whose genitalia a good drawing was published in Albers and Warnecke (1934-35), *Int. Ent. Zeits.*, XXIX, p. 13. The new species comes, according to the genitalia, almost at the end of the subgenus, near *casearia* Stgr., in the group of species which Boursin considered as slightly transitional to his subgenus *Eremodrina*. The development of a long costal arm marks this group out from the rest of the subgenus *Paradrina* Boursin. A superficial criterion from *clavipalpis* is the hind-wing iridescence, and the absence of rufous wedges before the fore-wing submarginal line.

Span : 26-29 mm.
Holy-Type : ♂, 18-27.IV.1940, 1500 m., Jebel Katherin, S. Sinaï (Egypt), in coll. Alfieri.
Allo-Type : ♀, 6-9.IV.1940, 390 m., Bir Isla, S. Sinaï (Egypt).
Para-Types : a long series taken at various heights from 390 to 1500 metres, in the Jebel Katherin district, S. Sinaï (Egypt), in coll. Alfieri and coll. Wiltshire.

Cuculliinae

Eumichtis aurora (Turati) aegyptiaca ssp. nov.

(Fig. 2, and Plate Figs. 4-5)

This form, recorded by Andres with the ridiculous determination *Cosmia ocellaris palleago*, is a race, which deserves a name, of the widespread Saharan Eremian species of Turati. The legs are unicolorous ochreous, not blackish-brown with ochreous bands as in the nymotypical

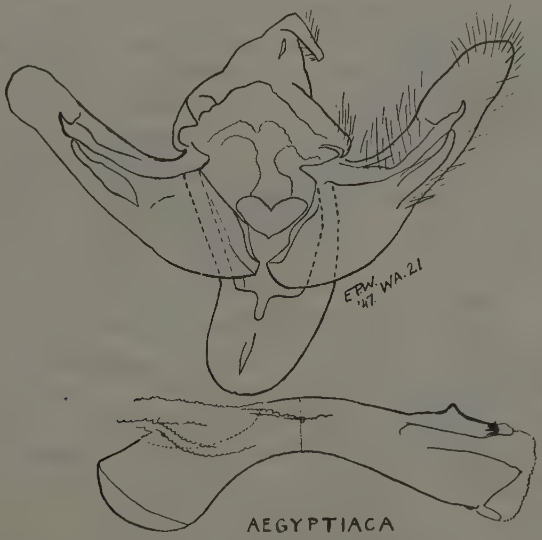
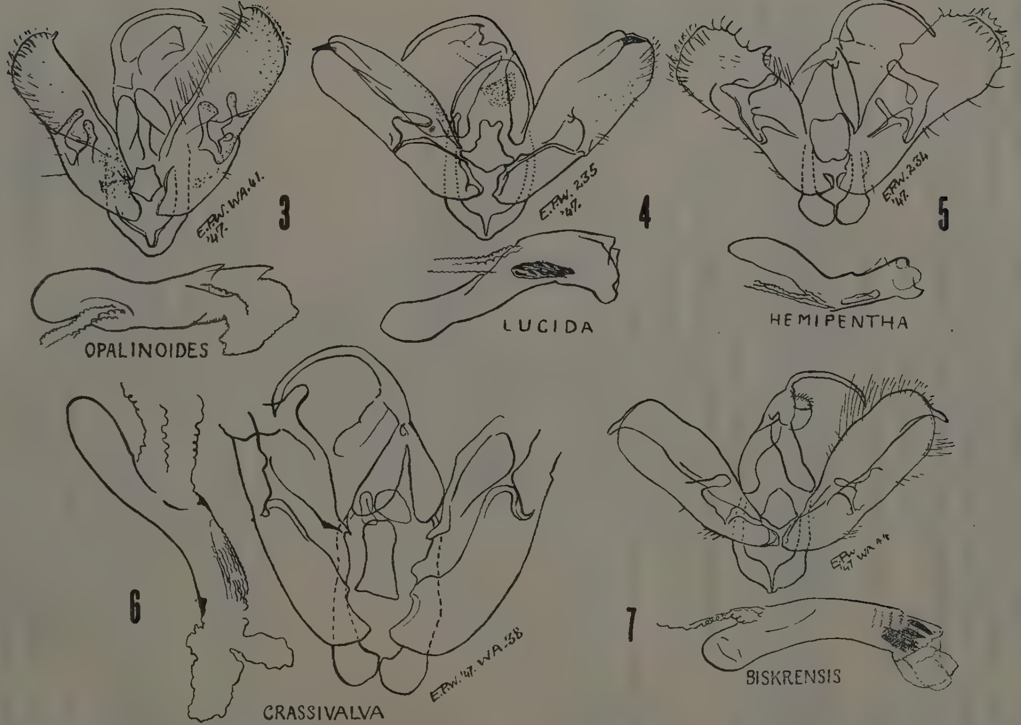


Fig. 2 : Ventral open view of ♂ genitalia of *Eumichtis aurora aegypliaca* subsp. nov., with aedeagus separated.


E.P.W. WA.61. '47.
3
OPALINOIDES
E.P.W. 235 '47.
4
LUCIDA
E.P.W. 234 '47.
5
HEMIPENTHA
6
E.P.W. '47. WA.38
CRASSIVALVA
E.P.W. '47 WA 41
7
BISKRENSIS

Figs. 3, 4, 5, 6 and 7 : Ventral open view of ♂ genitalia of *Tarache opalinoides* Guen., *lucida* Hufn., *hemipentha* spec. nov., *crassivalva* spec. nov., and *biskrensis* Ob., respectively, with aedeagi separated. The valve ends of the type of *crassivalva* were missing and are omitted.

race from Cyrenaica and the Moroccan form *commixta* Rungs. The forewing is paler and less heavily marked. It varies in intensity of markings and in size.

Span : 35-44 mm.

Holo-Type : ♂, 10.XII.23, Wadi Digla, near Cairo.

Allo-Type : ♀, 4.XII.25, Wadi Falig, near Hurgada (Eastern Desert), Egypt

Para-Types : bred from larvae found on *Zygophyllum*, Wadi Murrah (Eastern Desert), Egypt, in III.25; hatched : 15.XI.25, 2.III.25, and 16.III,25. Also specimens labelled : 2.XII.21, Heliopolis, Egypt; 1.III.26, Wadi Ascar (Eastern Desert), Egypt; and another labelled the same as the Holo-Type. In coll. Alfieri.

Erastrianae

Tarache hemipentha spec. nov.

(Fig. 5, and Plate Fig. 6)

Forewing, basal half, white, sometimes faintly marked with olive near base. The marginal half, except for a subapical white triangular spot on the costa, and the fringes near the tornus, is heavily suffused with blackish brown.

It differs from *T. marmoralis* F. especially in the whiter forewing colour in the male, and in the course of the postmedian line, which is bent at right angles to join the middle of the costa, whereas in *marmoralis* it is interrupted and joins the costa near the apex and both stigmata are clearly marked in the male. Perhaps previous records of *marmoralis* from Egypt (in Seitz, Vol. III, for instance) really refer to *hemipentha*. The dirty whitish hindwing, slightly greyer towards the termen, *inter alia*, distinguishes the moth from the larger and very variable *Tarache lucida* Hufn., whose hindwing is purer white marked with deeper black.

Span : 18-23 mm.

The male genitalia are illustrated (Fig. 5) together with the genitalia of other Egyptien *Tarache* species for comparison (Figs. 3, 4, 6 and 7).

Holo-Type : ♂, 1430 m., Bir Tarfa, middle IV.1940, S. Sinaï (Egypt). In coll. Alfieri.

Para-Type : ♂, 18.XI.44, Buraiman, near Jedda (Saudi Arabia), leg. A. R. Waterston. This specimen will be deposited in the British Museum.

The species thus appears to be an inhabitant of the Red Sea shores both North and South of the Tropic.

Tarache crassivalva spec. nov.

(Fig. 6, and Plate Fig. 8)

Forewing, white with olive grey costal shades, basal and antemedian lines, the latter being the clearer; antemedian line, wavy, double, outcurved under the cell and at right angles to the hind margin. Orbicular stigma, absent; reniform stigma; represented by a small fine black line in a pure white circle. Postmedian line, blacker purple, edged with black proximally near the hind margin and distally behind the cell up to the white subapical spot. Marginal area, olive grey purple-tinged, the white marginal line being only indicated clearly at the tornus. Termen, a brown line. Fringes, pale brown near the apex, white near the tornus.

Hindwing, white with pale red-brown neivures and terminal shade.

Span : 26 mm.

♂ genitalia, large, valves very heavily chitinised (Fig. 6).

Holo-Type ; ♂, Wadi el-Rabaa, 1500 m., Jebel Kätherine (S. Sinaï), Egypt, 27.IV.1940. In coll. Alfieri.

This species has been confused with *T. lucida* f. *insolatrix* Hubn., from which its hindwings should easily distinguish it. It more closely resembles the European *titania* Esp., the Abyssinian *secta* Guen., and the Indian *upsilon* Walk. From the first of these its pale hindwings will again serve as criterion; from *secta*, the absence of terminal black spots on the forewing; the shape and position of the costal shades on the forewing distinguish it, *inter alia*, from *upsilon*.

Acontianae

Earias waterstoni spec. nov.

Palp, white with a few darker scales.

♀ antenna, simple, brown.

Head and thorax, green.

Forewing, glossy green, as in *chlorophyllana* Stgr. and *syrticola* Turati, but with fringes basally green, distally ochreous. There are slight traces of cross-lines, indicated in darker green distally near the hind margin.

Hindwing, transparent whitish with red-grey termen near apex and white fringe.

Underside forewing, greenish-grey, with creamy-white costa and green fringe.

Span : 15-16 mm.

Holo- and para-Types : ♀♀, 8 and 12.XII.44, Buraiman (South of Jedda), S. W. Arabia. (leg. A. R. Waterston).

Evidently close to *chlorophyllana* and *syrticola* but differing slightly in details and smaller. That they will prove to be all one species is not out of the question.

Catocalinae

Clytie sabaea spec. nov.

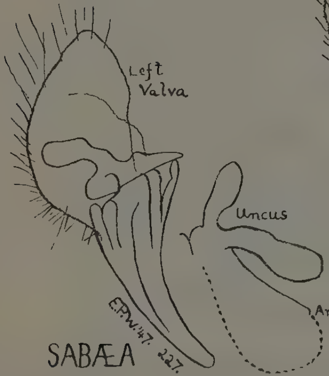
(Fig. 8, and Plate Fig. 13)

Antenna, ♂, with fairly long cilia, setose-ciliate.

Forewing, with the characteristic double postmedian line and other markings of *C. haifae* Habich, but proportionately broader. In the one example available, the ground-colour is also clearer yellow-brown, the terminal field paler. Orbicular stigma absent or obsolete, not a clear white spot as in *haifae*.

Hindwing, more contrasted; fringes, whiter.

Male genitalia, distinct from *haifae*, the upper lobe of the uncus being larger in *sabaea*, more rod-like in *haifae;* the lower lobe longer and pointed in *haifae*. In *haifae* the harpes are assymmetrical, and the left harpe is longer and tapering, which is not so in the left harpe of *sabaea* (Figs. 8 and 9).



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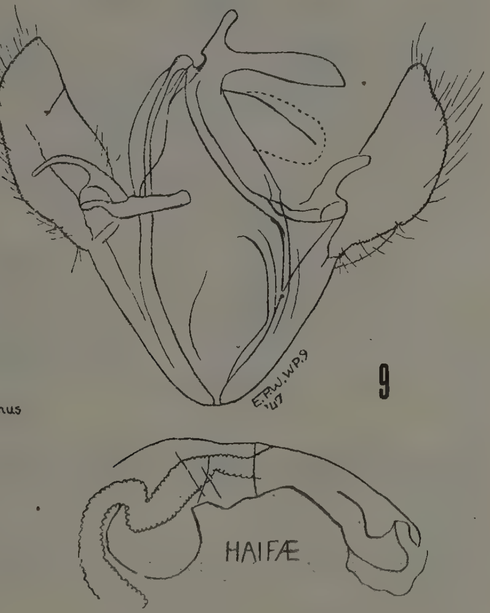

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Figs. 8 and 9 : Ventral open view of ♂ genitalia of *Clytie sabaea* spec. nov. and *haifae* Habich respectively, with aedeagus separated. Only the uncus, and left valve of *sabaea* are shown, these being the parts differing.

Span : 33 mm.

Holo-Type : ♂, 7.III.45, Sabya (Asir), S.W. Arabia (leg : A. R. Waterston). Will be deposited in the British Museum.

Without a longer series I am not sure that all the above differences will hold good to distinguish *sabaea* from *haifae ;* but the longer-ciliated antenna, broader and shorter forewing, and distinct, though closely-related genitalia, are reliable criteria.

GEOMETRIDAE

Larentiinae

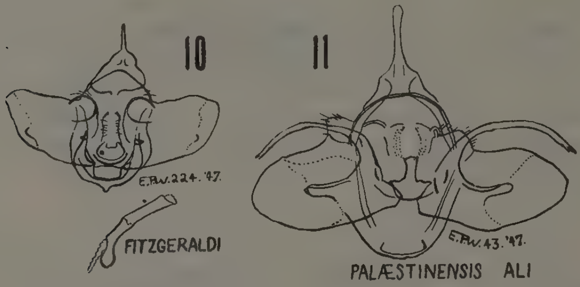
Lithostege fitzgeraldi spec. nov.

(Fig. 10, and Plate Fig. 15)

Antenna, ♂, black, minutely ciliate below, white-scaled above.

Thorax, pale grey.

Forewing, pale satin grey, narrower than *L. palaestinensis* Ams. Fringes, whitish grey. Hindwing, semi-transparent grey, fringes white.



Figs. 10 and 11 : Ventral open view of ♂ genitalia of *Lithostege fitzgeraldi* spec. nov. and *palaestinensis* subsp. *ali* Wilts. respectively, with aedeagus separated. In *ali* the aedeagus is omitted.

Underside, forewing, glossy brownish grey except near apex, where there is a whitish triangular patch.

Span: ♂, 22 mm., ♀, 24 mm.

Male genitalia, show affinity with the rest of the *L. griseata-farinata* group but differ strikingly in the reduction to negligible proportions of the costal arm. Apparently a more primitive type (Figs. 10 and 11 show the genitalia of this species and *palaestinensis* ssp. *ali* Wilts.).

This interesting little species flies together with, or at least in the same desert region of Arabia as, *L. notata* B.-Haas and *L. palaestinensis* ssp. *ali* Wilts. It mght be taken for a dwarf form of the latter but can be distinguished not only by its small size but by its wing-shape and genitalia. It now appears possible that some of the *Lithostege* which I recorded from Nejf, etc., S. W. Iraq, as a dwarf form of *ali* are in fact this species, though of course *L. palaestinensis ali* is widespread in and characteristic of Iraq.

Holy-Type: ♂, 18.II.46, Artawiya (Nejd), Arabia, leg. D. Vesey-Fitzgerald. Will be deposited in the British Museum.

Allo-Type : ♀, 18.I.44, Hail (Arabia). In my collection.

GEOMETRINAE

Zamarada secutaria Guen.

(Plate Fig. 14)

Zamarada secularia Guen., Spec. Gen. Lep., 10: 45.

The illustration shows the Arabian form of this little-known species, described from Abyssinia. The specimens from the Jeddah district taken by B. P. Uvarov, C.M.G., may eventually require a subspecific name but this is not yet sure. In Egypt (N. Sinai) a lighter redder form occurs. I have compared the genitalia of the Arabian and Sinai specimens on the one hand with para-types of *Zamarada minimaria* Swinh. subsp. *iranica* Brandt from S. Persia and have found clear differences justifying the continued separation of these two pretty species.

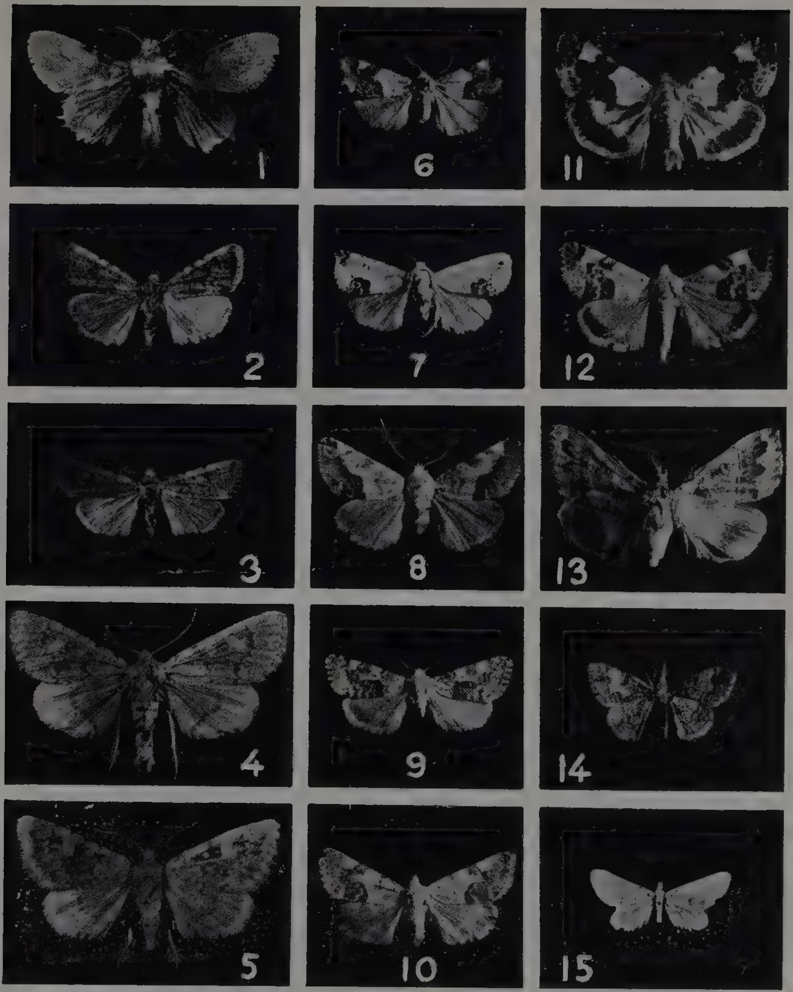


Fig. 1 : *Lambessa gibbonsi* spec. nov. — Figs. 2 and 3 : *Caradrina katherina* spec. nov. — Figs. 4 and 5 : *Eumichtis aurora aegyptiaca* subsp. nov. — Fig. 6 : *Tarache hemipentha* spec. nov. — Fig. 7 : *Tarache opalinoides* Guen. — Fig. 8 : *Tarache crassivalva* spec. nov. — Figs. 9 and 10 : *Tarache biskrensis* Ob. — Fig. 11 : *Tarache lucida* Hufn. — Fig. 12 : *Tarache lucida* f. *insolatrix* Hubn. — Fig. 13 : *Clytie sabaea* spec. nov. — Fig. 14 : *Zamarada secutaria* Guen. — Fig. 15 : *Lithostege fitzgeraldi* spec. nov.

R

Egyptian Lepidoptera

SOME ADDITIONS AND CORRECTIONS TO PREVIOUS LISTS

by E. P. Wiltshire, F.R.E.S.

The best available list of Egyptian Lepidoptera is that of Andres and Seitz in *Senckenbergiana*, V, VII (1923, 1925). On comparing it with Egyptian material available for study in Cairo I realised that though still useful it is misleading in various details, due to the progress of our science since it was written. The material to which I refer consists of two collections : the Alfieri collection, and the Petroff collection, temporarily housed in the Society's premises. The former is in beautiful condition and contains some new material from Sinai probably to be seen nowhere else, as well as older material which the late Andres must have seen before writing his list referred to above. There is no doubt that these old specimens, bearing Andres' determinations are conspecific with the material Andres sold in Germany in 1920. In those cases therefore where it proved necessary to correct the old determinations, one can safely not only add, to the Egyptian list, the new determination, but one can delete from it the old incorrect one. The Petroff collection also contains material which Andres saw and to which the same considerations apply ; it is however unfortunately in bad condition, owing to the damp climate of Alexandria where Petroff resided until his recent death, and its value is further reduced by the fact that it contains non-Egyptian insects also but no specimen is labelled, the data for each being given only in an accompanying catalogue. Nevertheless it is an interesting collection, and in most cases the localities of the specimens are not in doubt ; furthermore it is complimentary to the Alfieri collection : the two collections together cover the Alexandria-Mariout district, Sinai, the Cairo and Eastern desert regions and the Lower Nile valley and delta quite adequately ; the extreme south is more sketchily represented. Ferrante's, Innes Bey's, and Chakour's collections, which are poor in Lepidoptera, are also stored in the Society's premises and have been examined.

The present paper, as the title indicates, does no more than publish the additions and corrections which my recent studies of this material show

Bull. Soc. Fouad Ier Entom., XXXI, 1947. [13].

are necessary. A full new list of the Egyptian Lepidoptera will, it is hoped, begin to appear in the Society's Bulletin next year. It will contain fuller data regarding the butterflies and moths mentioned below for which here only the habitat is briefly indicated. The reasons for the corrections here briefly given will also, it is hoped, be discussed in this coming list, whose preparation naturally takes time, especially since my studies can only be pursued in the all too scanty leisure moments which my official work leaves me in Cairo.

I must acknowledge the assistance of various correspondents, in particular Messrs. Charles Boursin, Emilio Berio, Bryan Beirne, W. Brandt.

I am particularly grateful to Mr. Anastase Alfieri, not only for immediately and ungrudgingly putting at my disposal his precious collection but also for permitting me to dissect specimens therefrom where necessary; the resulting microscopic slides now form an annexe to his collection.

Part I : DELETIONS

The following are to be deleted from the list of Egyptian Lepidoptera for reasons explained in paragraph 1 above; I have in all cases examined Egyptian specimens so determined. The correct determination, where known, is given in brackets.

Bryophila algae F. (recte *B. pallida* B.-Baker).
Bryophila perla F. (recte *B. muralis* Forst.).
Bryophila maeonis Led.
Polia peregrina Tr. (recte *Crino compitalis* Draudt).
Cosmia ocellaris Bork. (recte *Eumichtis aurora aegyptiaca* Wilts.).
Aporophyla australis Boisd.
Autophila dilucida Hubn. (recte *A. rosea* Stgr.).

In addition, the following records appear to be on geographical and ecological grounds quite impossible, but I have not seen the original specimens, nor any Egyptian specimens so determined :

Atethmia xerampelina Esp. *maculifera* Staudinger.
Nonagria maritima Tausch.

Of these two, *xerampelina* was recorded by Miss Jackson from Luxor, and the record was repeated without comment by Andres and Seitz; *maritima* was recorded by Hayward from Aswan. The two records will be discussed more fully in the full list in due course.

Part II : ADDITIONS

The following Lepidoptera, occurring within the frontiers of the Kingdom of Egypt, have not been previously recorded as so doing. Many of them are only known, so far, from the mountains of South Sinai.

Rhopalocera

Chrysophanus thersamon Esp., S. Sinai.
Cigaritis myrmecophila Dumont, Geneifa (Canal Zone).

Heterocera

Cossidae

Hypopta reibelli Ob. f. *mussolinii* Tur., Sinai.

Limacodidae

Coenobasis Farouki Wilts., S. Sinai.

Agrotidae

Bryophila pallida B.-Baker (bona species), Alexandria.
Bryophila muralis subsp. *amasina* Stgr., Alexandria.
Euxoa canariensis Rebel subsp. *diamondi* Bours., Sinai.
Agrotis forficula Ev., S. Sinai.
Rhyacia flammatra Schiff., Sinai.
Pronotestra silenides Stgr., Mariout and Sinai.
Euterpia laudeti Boisd., Sinai and Eastern Desert.
Brachygalea albolineata Blach., Sinai.
Pseudocopicucullia melanoglossa (Berio), Sheikh Fadl (Upper Egypt).
Cucullia strigicosta Boursin, Sinai and Eastern Desert.
Metlaouia oberthuri Deck., Mariout.
Metopoceras canteneri Dup., S. Sinai.
Antitype juditha Stgr., Sinai.
Eumichtis aurora (Tur.) subsp. *aegyptiaca* Wilts., Eastern Desert.
Autophila rosea Stgr. (bona species), Mariout.
Autophila cerealis Stgr., Sinai.
Autophila pauli Boursin, Sinai and Eastern Desert.
Autophila cymaenotaenia Bours. subsp. *orthotaenia* Wilts., Sinai.
Amphipyra tetra F., S. Sinai.
Caradrina flava Ob., Eastern Desert.
Caradrina katherina Wilts., S. Sinai.
Caradrina oberthuri Roths., S. Sinai.
Pseudathetis fixseni Christ., Eastern Desert.

Porphyrinia deserti Roths., S. Sinai.
Synthymia solituda Brandt, S. Sinai.
Tarache hemipentha Wilts., S. Sinai.
Tarache biskrensis Ob., Ma'adi (near Cairo); Sinai.
Tarache opalinoides Guen., Gebel Elba (S.E. Egypt).
Tarache crassivalva Wilts., S. Sinai.
Eulocastra mesozona Hamps., Eastern Desert.
Clytie sancta Stgr., Eastern Desert.
Scodionyx mysticus Stgr., Eastern Desert.
Anydrophila Fouadi Wilts., S. Sinai.
Africalpe nubifera (Hamps.) (=*intrusa* Kruger, 1939), Wadi Digla (near Cairo).
Phytometra (*? emichi* Rog. f.) *maria* Stgr., S. Sinai.
Syneda habibazel Dumont, Eastern Desert.
Syneda flexuosa Men., Eastern Desert.
Anumeta arenosa Brandt, S. Sinai.

Pyralidae

Euzophera trigeminata Warr. and Roths., Sinai.

There will certainly be further additions to publish when the material has been completely studied.

The species and forms named above as of my own authorship (Wilts.) are described on pages 3-11, except *Autophila cymaenotaenia orthotaenia* Wilts. of which the first description appeared in *Entom. Record and Journal of Variation*, LVI, p. 98 (1944), and the two species *Coenobasis Farouki* and *Anydrophila Fouadi* which are described on pages 1 and 2.

SUMMARY

The paper gives the names of seven, probably nine, species of Lepidoptera to be deleted from the Egyptian list, and the names of forty-three to be added thereto, making a net addition of thirty-four of which five species and one subspecies are new to science.

RESULTS OF THE ARMSTRONG COLLEGE EXPEDITION
TO SIWA OASIS (LIBYAN DESERT), 1935

Spiders

[Araneae]

(with 6 Plates)

by JACQUES DENIS, F.Z.S.

The spiders collected from 14th April to 11th September, 1935, by the Armstrong College Expedition to Siwa under the leadership of Mr. J. Omer-Cooper, are 1918 in number; there are 1444 from Siwa itself where, according to Mr. Omer-Cooper, as far as spiders are concerned, the collection is thought to be a fairly representative one, but the surrounding desert places were less thoroughly investigated. There are 688 adult specimens and 1230 juveniles of which 237 cannot be identified, at times even generically; this may possibly seem a large number, but for example 164 of them are very young Salticids, differential characters of which are often modified with every moult until the last one. As a rule, even in countries where the spider fauna is well-known young specimens are waived except for very characteristic species; this is much more so with exotic spiders. However I can say that 17 young examples belong to at least 6 species which cannot be determined, but are certainly unlike those represented by adult ones. In the same way I am unable to identify a female of *Chiracanthium*, too badly damaged for precise determination, but quite different from the other four species brought back by the expedition.

Altogether the collection is composed of 97 species, 7 of which have been left unnamed. This number is not a large one; collecting during the same time in a true Mediterranean district would certainly have yielded twice as many species; nothing will better show the uniformity of conditions offered to terrestrial life in the place searched.

I think that 25 species, or 25.77 %, are new ones. This is a large proportion and I fear it may be too large; chief amongst them are 12 new Salticids out of a total of 23; but the two sexes often differ greatly from one another in this family and I have possibly described a few as new where the other sex is already known. However, I have done my best.

In short, out of 97 species, 7 are unnamed, 25 are regarded as new ones, 65 were already known and their geographical distribution is pointed out in the following Table in which the commonest species are shown in ordinary types.

In this Table the double line between columns 10 and 11 is in connection with Egypt and a dash in it means that the species concerned has already been obserbed in Egypt. Columns 2 to 12 are in connection with the Palearctic Region for which I have followed Semenov-Tian-Shanskij's paper (1936); Palearctic Asia (2) is the subregion P in the map without separating the four provinces; in the same way, Middle Asia (3) is the *mesasiatica subregio* Ms; Temperate Europe (4) is the subregion E with the exception of the Arctic and Siberian parts; in Atlantic Islands (5) are included the Cape Verde Islands; Mediterranean West Europe (6) is the European part of the Mediterranean subregion Md 2; to the African part (7, 8, 9) of this is added the Sahara; Libya (10) is the whole ex-Italian colony, including the borders of the Mediterranean Sea; column 11 brings together the provinces Md 5, 6 and 7; column 12 is the Eastern Mediterranean province Md 4. In column 1 no distinction is made between Nearctic and Neotropical Regions. Columns 13 to 19 are in connection with the Ethiopian Region; Abyssinia (14) includes the borders of the Red Sea, column 19 the islands neighbouring Madagascar. No subdivisions are considered in either the Eastern Region (20), or the Australian Region (21).

It will be seen from the Table that 7 species are palearctic, 34 mediterranean; of 18 of them it may be said that they are as much mediterranean as ethiopian and 6 seem to be truly Ethiopian; but things are not so simple.

There is little to say about palearctic species although most of them seem to be rather southern ones which exceptionally spread more or less Northwards; two are doubtful identifications, *Euryopis quinqueguttata* and *Zelotes razoumowskyi*.

Mediterranean species may be distributed into several lots; 7 are true Mediterranean species and 9 other ones seem to be so, but they occasionally reach a few localities either in Abyssinia, or Arabia, or Soudan or even South Africa; the 18 remaining species are also mediterranean ones, but they are restricted to desertic parts and require a special mention.

The following groups of 18 species is rather ambiguous; eight species reach the south of France, but at least 6 are inhabitants of deserts and are to be compared with the desertic mediterranean ones; some, as *Argiope clarki* or *Metargiope trifasciata*, are more ethiopian than mediterranean.

Upon the whole, if we except desert ones, 23 species seem to be pa-

LIST OF SPECIES	AMERICA 1	PALÆARCHÆ-ARCTIC ASIA 2	MIDDLE ASIA 3	TEMPERATE EUROPE 4	ATLANTIC ISLANDS 5	MEDITERRANEAN WEST EUROPE 6	MOROCCO 7	ALGERIA 8	TUNIS 9	LIBYA 10		SYRIA AND SUMERICAN REGION 11	EASTERN MEDITERRANEAN REGION 12	SOUDAN 13	ABYSSINIA 14	SOUTH ARABIA 15	EAST AFRICA 16	WEST AFRICA 17	SOUTH AFRICA 18	MADAGASCAR 19	EASTERN REGION 20	AUSTRALIAN REGION 21
Filistata insidiatrix					—	—	—	—	—	—	—	—	—		—	—		—				
Filistata puta								(a)	(a)	—	—	—										
Scytodes thoracica	—	—	—	—	—	—		—	—	—	—	—	—									
Scytodes velutina					—	—	—	—	(b)	—	—		(b)			(b)	—	—		—		
Loxosceles rufescens	—	—			—	—	—	—	—	—	—	—	—								—	—
Artema mauriciana					—				—	—	—				—	—	—	—		—	—	—
Holocnemus pluchei						—	—	—	—	—	—	—	—									
Uloborus walckenaerius		(c)	—	—	—	—		—	—	—		—	—									
Uloborus plumipes		—			—	—		—	—	—	—	—	—	—	—							
Archaeodictyna anguiniceps									—	—	—											
Devade hirsutissima						—		—	—	—	—	—	—			—						
Stegodyphus lineatus deserticola						(d)	—	(a)	(a)	—	—	(d)	(d)									
Stegodyphus manicatus											—				—							
Agelena lepida deserta								(d)		—	(d				(d)							
Rothus atlanticus								—	—						?							
Lycosa ferox					—	—	—	—	—	—	—	—						—				
Lycosa urbana							(e)	—	—	—	—			—	—	—	—	—		—	?	
Arctosa cinerea	—			—	—	—	—	—	—		—	—	—					—				

LIST OF SPECIES	AMERICA	PALÆARCHÆ-ARCTIC ASIA	MIDDLE ASIA	TEMPERATE EUROPE	ATLANTIC ISLANDS	MEDITERRANEAN WEST EUROPE	MOROCCO	ALGERIA	TUNIS	LIBYA		SYRIA AND SUMERICAN REGION	EASTERN MEDITERRANEAN REGION	SOUDAN	ABYSSINIA	SOUTH ARABIA	EAST AFRICA	WEST AFRICA	SOUTH AFRICA	MADAGASCAR	EASTERN REGION	AUSTRALIAN REGION
	1	2	3	4	5	6	7	8	9	10		11	12	13	14	15	16	17	18	19	20	21
Arctosa quadripunctata								—	—													
Pardosa venatrix			—			—		—	—	—	—	—		—	—	—					—	
Pardosa injucunda										—	—	—		—	? —		—	—				
Evippa ungulata								(a)	—	—	—					—						
Peucetia arabica										—	—		—	—	—	—						
Zodarion pileolonotatum										—												
Euryopis quinqueguttata				—		—							—									
Theridion aulicum				—	—	—	—	—	—	—	—	—	—					—				
Theridion tuberculatum .			—		—		—	—	—	—	—					—						
Tetragnatha nitens					—	—	—	—	—	—	—	—	—		—		—		—	—		—
Argiope clarki			—		—			—	—		—			—	—	—		—				
Metargiope trifasciata .	—				—		—	—	—	—	—			—	—		—	—		—	—	—
Cyrtophora citricola					—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Cyclosa insulana		—			—	—		—	—	—	—		—	—	—	—	—	—	—		—	
Larinia chloreis										—	—			—								
Larinia acuticauda														—								
Araneus dalmaticus						—		—	—	—		—	—		—							
Araneus dalmaticus minor								(a) —	(a) —	—												

LIST OF SPECIES	1 AMERICA	2 PALÆARCHÆ-ARCTIC ASIA	3 MIDDLE ASIA	4 TEMPERATE EUROPE	5 ATLANTIC ISLANDS	6 MEDITERRANEAN WEST EUROPE	7 MOROCCO	8 ALGERIA	9 TUNIS	10 LIBYA		11 SYRIA AND SUMERICAN REGION	12 EASTERN MEDITERRANEAN REGION	13 SOUDAN	14 ABYSSINIA	15 SOUTH ARABIA	16 EAST AFRICA	17 WEST AFRICA	18 SOUTH AFRICA	19 MADAGASCAR	20 EASTERN REGION	21 AUSTRALIAN REGION
Araneus suspicax						—		—		—	—											
Eusparassus dufouri oraniensis						—	—	—	—						—							
Eusparassus walckenaeri								—	—	—	—	—	—	—	—	—	—		—	—		
Tmarus piochardi						—		—	—			—	—			—	—				—	
Thomisus onustus		—	—	—	—	—	—	—	—			—	—						—			
Thomisus hilarulus					—	—		—	—	—	—	—	—									
Thomisus spinifer						—		—		—	—	—		—	—	—	—	—		—	—	
Synaema diana									—		—	—			—	—	—			—		
Philodromus glaucinus						—	—	—	—			? —	—									
Thanatus fabricii										—	—											
Thanatus albini											—	—										
Thanatus adjacens									—	—	—	—			—							
Tibellus vossioni								—					—	—	—		—	—	—			
Zelotes simplex								—														
Zelotes razoumowskyi		—	—	(f) —	—	—	—	—	? —			—	—								—	
Pterotricha isiaca										—	—											
Minosiella mediocris								—	—		—											
Chiracanthium isiacum										—	—				? —							

LIST OF SPECIES	AMERICA	PALÆARCHÆ-ARCTIC ASIA	MIDDLE ASIA	TEMPERATE EUROPE	ATLANTIC ISLANDS	MEDITERRANEAN WEST EUROPE	MOROCCO	ALGERIA	TUNIS	LIBYA		SYRIA AND SUMERICAN REGION	EASTERN MEDITERRANEAN REGION	SOUDAN	ABYSSINIA	SOUTH ARABIA	EAST AFRICA	WEST AFRICA	SOUTH AFRICA	MADAGASCAR	EASTERN REGION	AUSTRALIAN REGION
	1	2	3	4	5	6	7	8	9	10		11	12	13	14	15	16	17	18	19	20	21
Chiracanthium equestre .										—	—											
Castaneira antinorii								—	—					—								
Synageles repudiatus											—											
Heliophanus decoratus										—	—			—	—							
Evophrys fulgens											—	—										
Menemerus soldani											—											
Menemerus animatus								—	—	—	—	—	—	—		—		—				
Bianor albobimaculatus					? —	—	—	—	—	—	—	—	—	—								
Phlegra memorialis											—											
Aelurillus conveniens .												—										
Mogrus bonneti											—	—										
Thyene imperialis ...					—	—	—	—	—	—	—	—	—	—	—	—					—	

(a) in desert. — (b) at least by its form *velutina* E. Simon. — (c) a doubtful record after two young specimens from Kan-Sou by Schenkel (*Ark. Zool. Stockholm*, XXIX, 1936, p. 13). — (d) the typical form. — (e) subspecies *taurirtensis* Schenkel 1937.— (f) Siberia.

learctic or at least mediterranean, 24 have ethiopian affinities or are confined to deserts, and 18 extend either in mediterranean or in ethiopian region. And Siwa seems to bring both faunas into contact.

At least 8 species are restricted to Libya or Egypt; out of the new species, most are rather nearly allied to already known species from mediterranean or south-mediterranean region. A few ones require a special mention : *Cerbalus* is a desert genus; *Thyenula*, though near *Thyene*, is only known from south Africa; *Eugasmia* is an oriental genus, but very near *Philaeus* and *Carrhotus* which are distributed over a large area and both reach the mediterranean region; *Gamasomorpha* is a very widespread genus not known from any part of the holarctic region, it has been found in East Africa and South Arabia.

Now, if we look at the frequency of species, I have distributed them into three groups. In the first one are included 19 species of which 25 or more examples were collected; they are 5 Argiopids, 3 Lycosids, 3 Salticids, 2 Thomisids, 2 Sparassids and one species belonging to each of the following families Pholcidae, Eresidae, Sicariidae and Clubionidae. By far the commonest species is *Lycosa urbana* of which 419 examples were collected; this species is very variable in size and colour. Next comes the Egyptian *Thanatus fabricii* with 120 specimens. Then, the widely spread *Artema mauriciana*, (88 specimens), *Argiope clarki* and *Metargiope trifasciata* (76), the Mediterranean *Araneus suspicax* (65), the Syrian and Egyptian Salticid *Evophrys fulgens* (60), *Pardosa venatrix* (59), the Egyptian *Mogrus bonneti* (49), the palearctic *Araneus dalmaticus* by 1 typical specimen and 48 belonging to the desert form *minor*, *Thyene imperialis* (48), the new *Larinia ovata* (39) nearly allied to the Egyptian *L. atomaria* (O.P. Cambr.), *Thomisus hilarulus* (38), *Stegodyphus manicatus* (37), *Loxosceles rufescens* (35), *Castaneira antinorii* (31), *Arctosa quadripunctata* (30), *Eresus walckenaerius* (26) and *E. dufouri oraniensis* (25). None of these species is a true palearctic one.

Next come 8 species represented by less than 25 and more than 10 species : *Thanatus albini* (20) and *T. adjacens* (16), *Larinia acuticauda* and *Chiracanthium tenue* (15), *Thomisus onustus* and *T. spinifer* (14), *Larinia chloreis* and *Heliophanus albescens* (13). Except *Thomisus onustus* and *spinifer*, all these species are distributed over a very restricted area.

Last 62 species are represented by few or unique examples. There are 9 specimens of one species and 8 of another; 4 species are represented by 7 specimens, 3 by 6, 6 by 5, 5 by 4, 11 by 3, 9 by 2 and 23 species are represented by unique specimens. In addition there are at least six indeterminable species apart from those mentioned above.

Before giving the list of the spiders brought back by the Expedition to Siwa, I wish to express thanks to Mr. Omer-Cooper who has chosen me for working out his collection, and to the Trustees of the British Museum (Natural History) who have committed to me the said collection from which they were kind enough to offer several duplicate specimens.

LIST OF SPECIES

In the collection there is no representative of the Mygalomorph Spiders which are regarded as the most primitive ones after the Liphistiids. All the species collected belong to the sub-order *Dipneumonomorphae*.

TRIONYCHAE

Fam. FILISTATIDAE

1. Filistata insidiatrix (Forskäl) 1775.

Aranea insidiatrix Forskäl, Descr. Anim., etc., 1775, p. 86, pl. 24, fig. G.
Filistata testacea Latreille, Consid. Gén., 1810, p. 121.
Filistata bicolor Walckenaer, Faune Fr. Aran., 1825, p. 9, pl. 6, figs. 1-3.
Filistata bicolor L. Dufour, Ann. Soc. Entom. Fr., (1) V, 1836, p. 534.
Filistata bicolor Walckenaer, Apt. I, 1837, p. 254, pl. 6, fig. 1.
Teratodes attalicus C. L. Koch, Arachn., V, 1839, p. 6, fig. 343.
Œcobius nigripalpis L. Dufour, Ann. Soc. Entom. Fr., (4) III, 1863, p. 6, pl. I, fig. 2.
Filistata insidiatrix E. Simon, Hist. nat. Araignées, 2e Ed., I (4), 1895, p. 766 foot-note 1.
Filistata insidiatrix E. Simon, Ann. Soc. Entom. Fr., LXXIX, 1910, p. 299.
Filistata insidiatrix L. Berland, Arch. Zool. Exp. Gén. Paris, (5) IX, 1912, p. LI, figs. 2-4.
Filistata insidiatrix E. Simon, Arach. Fr., VI (I), 1914, p. 71.

Locality. — Siwa, 20.IV, 6 ♀♀, adult or juvenile (n. 209-214).

Distribution. — A very common spider all around the Mediterranean Sea and in the Atlantic Islands (Azores, Madeira, Canary); it is regarded as a characteristically Mediterranean species. Southward it has been found as far as Guerrara in Southern Algeria (Dufour, 1863, p. 6), Sebha and Serdeles in Fezzan (di Caporiacco, 1936 b, p. 72), Giarabub Oasis (di Caporiacco, 1928, p. 81), Senegal (Simon, 1893 b, p. 258); also in Yemen (*ibid.*). Abyssinia (sec. Bristowe, 1934, p. 739).

Remarks. — Out of the six specimens brought back from Siwa four lack the usual black triangular spot and the marginal line on the cephalothorax; such a variety has already been found in France at Banyuls-sur-mer (Simon, 1914, p. 71) and in the Azores (Berland, 1932, p. 73); an intermediate form in which only the marginal line is wanting lives in Port-Cros Island (Denis, 1934, p. 143). The black spots underneath the femora are also missing in the four specimens here dealt with.

2. Filistata puta O. P. Cambridge 1876.

or Filistata insidiatrix puta (O. P. Cambr.) 1876.

Filistata puta O. P. Cambridge, Proc. Zool. Soc., 1876, p. 544.
Filistata puta E. Simon, Ann. Soc. Entom. Fr., LXXIX, 1910, p. 299.

Locality. — Siwa, 16-19.VIII, 1 ♀ (n. 464).

Distribution. — Algerian and Tunisian Sahara (Simon, 1908 a, p. 421). Libya : Djebel Gharian (*ibid.*), Ouadi M'bellem (Karsch, 1881, *F. testacea*), Giarabub, Porto Bardia (di Caporiacco, 1928, p. 81), Fezzan between Sebha and Brach (di Caporiacco, 1936 b, p. 72). Egypt : Alexandria (Cambridge, 1876, p. 544).

Syria (Simon, 1908 a, p. 421).

Fam. SICARIIDAE

3. Scytodes thoracica (Latreille) 1804.

Aranea thoracica Latreille, Hist. nat. Crust. Ins., VII, 1804, p. 249.
Scytodes thoracica Walckenaer, Hist. nat. Aran., 1806, fasc. I, fig. 10.
Scytodes thoracica Walckenaer, Apt., I, 1837, p. 270.
Scytodes tigrina C. L. Koch, Arachn., V, 1839, p. 84, fig. 398.
Scytodes camerata Hentz, J. Boston N. H. Soc., VI, 1850, p. 35, pl. IV, fig. 17.
Scytodes thoracica auct. rec.

Locality. — Siwa, 20-30.V, 1 ♀, 2 juv. (n. 108-110) ; 14.VIII, 1 juv. (n. 423) ; 30.VIII, 1 juv. (from tube n. 99-106) ; 31.VIII, 1 ♀ ; 10.IX, 1 juv. from houses (from tube n. 697-698).

Distribution. — A very common spider in the whole of Europe, North Africa, Atlantic Islands, U.S. of America. In southern countries it usually lives in open air, under stones, but it becomes domestic in colder climates : in France this seems to happen in Maine-et-Loire (de Dalmas, 1920 a, p. 60).

4. Scytodes velutina Heineken and Lowe 1835.

Scytodes velutina Heineken and Lowe, Zool. Journ., V. 1835, p. 321.
Scytodes amarantea Vinson, Aran. Réun., etc., 1864, p. 11, pl. I, fig. 2.
Scytodes unicolor Canestrini, Ann. Soc. Nat. Modena, III, 1868, p. 202.
Scytodes kochi O. P. Cambridge, Proc. Zool. Soc., 1876, p. 564.
Scytodes velutina E. Simon, Ann. Soc. entom. Fr., LXXIX, 1910, p. 304.

Locality. — Siwa, 20-30.VI, 1 ♀, 1 juv.

Distribution. — Nearly the whole of Africa, Atlantic Islands, Arabia, Madagascar, France : Banyuls-sur-mer (Berland, 1914, p. 61 ; Denis, 1933, p. 545).

5. Loxosceles rufescens (L. Dufour) 1820.

Scytodes rufescens L. Dufour, Ann. Sc. Phys., V, 1820, p. 203, pl. 76, fig. 5.
Loxosceles citigrada Lowe, Zool. Journ., V, 1835, p. 322, pl. 48, figs. 1-14.
Scytodes rufescens Walckenaer, Apt., I, 1837, p. 274.
Scytodes erythrocephala C. L. Koch, Arachn., X, 1839, p. 90, figs. 399-400.
Scytodes pallida Blackwall, Ann. Nat. Hist., (3) XVI, 1865, p. 100.
Loxosceles rufescens E. Simon, Aran. Nouv., 2e Mém., Liège, 1873, p. 69.
Spermophora comoroensis A. G. Butler, Ann. Nat. Hist., (5)IV, 1879, p. 43, pl. I, fig. 4.
Loxosceles erythrocephala Thorell, Cat. Spid. Burma, 1895, p. 68.
Loxosceles rufescens Banks, Proc. Calif. Acad. Sci., 1898, p. 209.
Loxosceles rufescens Bösenberg und Strand, Jap. Sp., 1906, p. 113, pl. VI, fig. 69, and pl. XVI, fig. 450.
Loxosceles rufescens E. Simon, Ann. Soc. Entom. Fr., LXXIX, 1910, p. 306.
Loxosceles rufescens E. Simon, Arachn. Fr., VI(I), 1914, p. 75, fig. 127.

Locality. — Siwa, 20-30. V, 3 ♂♂, 8 ♀♀, 8 juv. (n. 114-133); 16.VI, 1 juv. (n. 277); 6.IX, 1 ♂ subad. (n. 647), 1 juv. (from tube n. 646); 10.IX, 4 ♂♂ subad., 9 ♀♀ of which 2 seem to be adult, from houses (n. 702-711).

Distribution. — A very widely distributed species known from the Mediterranean region, the Atlantic Islands, Burma, Malay Archipelago, China, Japan, Samoa, Costa-Rica, Mexico, U.S. America, Bermudas.

Fam. PHOLCIDAE

6. Artema mauriciana Walckenaer 1837.

Artema mauriciana Walckenaer, Apt., I, 1837, p. 656.
Pholcus sisyphoides Doleschall, *in:* Nat. Tijdschr. Nederl. Indie, XIII, 1857, p. 408.
Artema convexa Blackwall, Ann. Mag. Nat. Hist., (3)II, 1858, p. 332.
Pholcus borbonicus Vinson, Aran. Réunion, etc., 1863, pp. 152 and 307, pl. 3, fig. 4.
Pholcus borbonicus L. Koch, Aeg. Abyss. Arachn., 1875, p. 25, taf. 3, fig. 1.
Artema sisyphoides Thorell, Ann. Mus. Civ. St. Nat. Genova, XVII, 1881, p. 179.
Artema mauricia E. Simon, Hist. Nat. Ar., 2e éd., I (2), 1893, p. 463, figs. 451-454.
Artema mauricia Kulczynski, Bull. Acad. Cracovie, 1901, pl. I, fig. 15.
Artema kochi Kulczynski, Bull. Acad. Cracovie, 1901, p. 20, pl. I, fig. 14.
Artema mauriciana Tullgren, Schwed. Exp. Kilimandj., XX, 1910, p. 119, pl. 2, fig. 35.

Locality.— Siwa, 20-28.V, 1 ♂ (n. 738); 20-30.V, 1 ♂, 8 ♀♀ n. ad., 17 ♀♀, 19 juv. (n. 82-91); 4.VI, 2 ♂♂, 2 ♂♂ n.ad., 2 ♀♀, 9 juv. (n. 257-266); 12.VII, 2 ♂♂, 1 ♂ n.ad., 6 ♀♀, 7 juv. (n. 139-148); VIII, 2 ♂♂ n.ad., 1 ♀, 3 juv. (n. 565-570); 6.IX, 1 juv. (n. 648); 10.IX, 1 ♂ n.ad., 1 ♀ n.ad., 2 juv., from houses (n. 697-698).

Distribution. — A very common spider distributed through nearly the whole of Africa including Madagascar, Arabia and tropical Asia; Tunis (Simon, 1843, p. 465); Cape Verde Islands (Berland, 1936, p. 81).

This species has been accidentally found in Athens (Bristowe, 1934, p. 755). Hawaï (Simon, 1908 a, p. 427).

7. Holocnemus pluchei (Scopoli) 1763.

Aranea pluchei Scopoli, Ent. Carn., 1763, p. 404.
?*Aranca rivulatus* Forskäl, Descr. Anim., etc., 1775, p. 86.
Pholcus rivulatus Audouin, Descr. Eg., 1825, p. 140, pl. 3, fig. 12.
Pholcus rivulatus Walckenaer, Apt., I, 1837, p. 653.
Pholcus impressus C. L. Koch, Arachn., IV, 1838, p. 99, fig. 313.
Pholcus barbarus H. Lucas, Expl. Alg., Ar., 1846, p. 237, pl. 15, fig. 1.
?*Pholcus ruralis* Blackwall, Ann. Nat. Hist., (3) 1, 1858, p. 432.
Pholcus pluchei E. Simon, Ann. Soc. Entom. Fr., (4) VI, 1866, p. 122, pl. 2, fig. 11.
Holocnememus rivulatus E. Simon, Arachn. Fr., I, 1874, p. 256.
Holocnemus pluchei E. Simon, Arachn. Fr., VI (1), 1914, p. 238.

Localities. — Siwa, 13.VIII, 1 ♂ n.ad., 1 ♀ (n. 422-423). Khamissa, 25.VIII, 2 juv. (?).

Distribution. — Nearly the whole Mediterranean region.

Fam. ULOBORIDAE

8. Uloborus walckenaerius Latreille 1806.

Uloborus walckenaerius Latreille, Gen. Crust. Ins., I, 1806, p. 110.
Uloborus walckenaerius Walckenaer, Apt., II, 1842, p. 228.
Veleda lineata Blackwall, Ann. Nat. Hist., (3) III, 1859, p. 372.
Veleda lineata Blackwall, Spid. Gr. Br. Ir., I, 1861, p. 150, pl. 10, fig. 96.
Uloborus pallens Blackwall, Ann. Mag. Nat. Hist., (3) VIII, 1862, p. 372.
Uloborus walckenaerius E. Simon, Arachn. Fr., I, 1874, p. 170.
Uloborus walckenaerius O. P. Cambridge, Sp. Dorset, II, 1881, pp. 285 and 580, pl. VI, fig. 2.
Uloborus walckenaerius Becker, Arachn. Belg., II, 1896, p. 70, pl. XIV, fig. 3.
Uloborus walckenaerius E. Simon, Hist. Nat. Ar., 2e édit., I (1), 1892, p. 211, figs. 157 and 159.
Uloborus walckenaerii Chyzer et Kulczynski, Aran. Hung., I, 1892, p. 147, tab. VI, fig. 16.
Uloborus walckenaerii Bösenberg, Sp. Deutsch., 1901, p. 54, pl. 4, fig. 48.
Uloborus walckenaeri de Lessert, Cat. Ar. Suisse, 1910, p. 13.
Uloborus walckenaerius E. Simon, Arachn. Fr., VI (1), 1914, p. 27.
Uloborus walckenaerius Roewer, Tierw. Mitteleur., Arachn. VI, 1929, p. 108, figs. 1216-1217.

Localities. — Siwa, 20-30.V, 1 ♂ (from tube n. 134-138). Khamissa, 22.VI, 1 ♀ subad. (n. 932).

Distribution. — A common spider throughout the Mediterranean region, reaching the Fontainebleau Forest in France (Simon, 1914, p. 30), Bloxworth, Lyndhurst Heath in New Forest, Wokingham, in England (Cambridge, 1881, p. 285), Redu in Belgian Luxemburg (Becker, 1896, p. 70), Germany (Roewer, 1929, p. 108), Valais and Tessin in Switzerland (de

Lessert, 1910, p. 13), Tyrol, Western and Northern Hungary (Chyzer and Kulczynski, 1892, p. 147), South Russia, Transcaucasia, Turkestan (Reimoser, 1919, p. 18). It is also to be found in Portugal (Bacelar, 1928, p. 175) and the Atlantic Islands (Blackwall, 1862, p. 372, *U. pallens;* Simon, 1883, p. 239, *U. pallens*).

9. Uloborus plumipes Lucas 1846.

Uloborus plumipes H. Lucas, Expl. Alg., Arachn., 1846, p. 252, pl. 15, fig. 8.
Uloborus costae Thorell, Ofv. Akad. Forh., XV, 1858, p. 195.
Uloborus signatus O. P. Cambridge, Proc. Zool. Soc., 1876, p. 579.
Uloborus plumipes E. Simon, Arachn. Fr., I, 1874, p. 166.
Uloborus niloticus E. Simon, Bull. Soc. Zool. Fr., IX, 1884, p. 20.
Uloborus plumipes E. Simon. Hist. Nat. Ar., 2^e éd., I (1), 1892, p. 211, fig. 158.
Uloborus plumipes E. Simon, Arachn. Fr., VI (1), 1914, p. 27.

Locality. — Siwa, 10.IX, 1 ♀, 1 juv. from houses (n. 712-713).

Distribution. — The Mediterranean region and a great part of Africa; Cape Verde Islands (Berland, 1936, p. 85).

Fam. DICTYNIDAE

10. Archaeodictyna anguiniceps (E. Simon) 1899.

Dictyna anguiniceps E. Simon, Bull. Soc. Entom. Fr., 1899, p. 244 fig.
Archaeodyctina anguiniceps di Caporiacco, Ann. Mus. Genova, LIII, 1928, p. 79.

Locality. — Baharein, East Lake shore, 13.VI (M. Cameron), 3♂♂, 1 ♂ subad., 1 ♀.

Distribution. — Tunis : Nefzaua (Simon, 1910, p. 283). Libya : Cufra, Buma, El Talab, El Hauari (di Caporiacco, 1933, p. 313), Gialo (di Caporiacco, 1936 a, p. 94), El Giof (*ibid.*, p. 99), Giarabub (di Caporiacco, 1928, p. 81). Egypt : Bir-Hooker (Simon, 1899 a, p. 244).

11. Devade hirsutissima (E. Simon) 1880.

Diotima hirsutissima E. Simon, Ann. Soc. Entom. Fr., (5) X, 1880, Bull., p. LIV.
Devade hirsutissima E. Simon, Bull. Soc. Zool. Fr., 1884, p. 323.
Devade hirsutissima E. Simon, Ann. Soc. Entom. Fr., LXXIX, 1910, p. 279.
Devade hirsutissima E. Simon, Arachn. Fr., VI (1), 1914, p. 43.

Locality. — Shores of Birket El Gessabaia (Lake Exabaïa), 1 ♀ from a shell of mussel (n. 1071).

Distribution. — A spider inhabiting sandy salt grounds.

France : Var : beach of les Sablettes near Toulon, beach of l'Almanarre near Hyères (Simon, 1914, p. 61); isthmus of Giens (Denis, 1937, p. 166); Bouches-du-Rhône : Martigues (Simon, 1880 a, 1914); Pyrénées-Orientales : Banyuls-sur-mer (Denis, 1933 a, p. 543). Spain : Cartagena

(Simon, 1910, p. 279). Greece : Melos (Bristowe, 1934, p. 743). Syria : banks of the salt lake of Djeroud (Gadeau de Kerville, 1926, p. 63). Aden (E. Simon, 1910). Egypt : Suez, Mariout (E. Simon, 1910). Libya : Giarabub (di Caporiacco, 1928, p. 81). Tunis : Gabès (Simon, 1885, p. 30); la Goulette, Nefzaua (Simon, 1910). Algeria : le Kreïder, Biskra, Baniou, Aïn Sefra (*ibid.*).

12. Altella libyca spec. nov.

(pl. I, fig. 1)

Locality. — Siwa, 29.IV-3.V, 2 ♀♀ (from tube n. 247-256).

Description. — ♀ length 3.75 and 4.75 mill. Cephalothorax yellow with on one specimen a few black marking behind the cephalic part and some very pale, brownish spots at the edges of the thorax; median front eyes scarcely smaller than the lateral ones. Falces yellow, a little orange-coloured, with a few strong hairs. Sternum yellow, greyish at its margin, extending in a long, rather wide, obtuse point between the hind coxae, sprinkled with deep points more numerous at the sides and behind (seeming to have been the insertions of fallen hairs). Lip and maxillae light reddish-drab. Legs yellow. Tibia I with an anterior lateral spine near its basis, tibia II with such a spine near its apex; metatarsus I with 1 (posterior), metatarsus II with 2 apical lower spines; lower spine of tibia III long, rather near the basis. Abdomen grey, lighter on its underside, exquisitely blackish hairy with a few stronger, long, black hairs in front.

Male unknown.

Remarks. — There is no *Altella* known from Egypt; di Caporiacco (1936 a, p. 99) indicates *A. desertorum* E. Simon from the Italian part of the Lybian Desert after one young spider found at Buema; the abdominal colour of this species does not agree with that of *A. libyca* which is also distinct from the other Algerian or European species.

Fam. ERIGONIDAE

13. Erigone (s.lat.) spec. ?

Locality. — Siwa, 20-28.V, 1 juv. (from tube n. 802-807).

It is quite impossible to determine young specimens belonging to this very difficult family, especially when they have been collected in non-European country.

Fam. ERESIDAE

14. Stegodyphus lineatus deserticola E. Simon 1908.

Stegodyphus lineatus deserticola E. Simon, Zool. Jahrb., XXVI, 1908, p. 421.
Stegodyphus lineatus deserticola E. Simon, Ann. Soc. Entom. Fr. LXXIX, 1910, p. 287.

Locality. — Siwa depression, 22.VIII, 2 ♀♀ on *Acacia* trees (n. 499-500).

Distribution. — Morocco : Mogador (Simon, 1910, p. 287 ; in *An. Soc. Esp. H.N.*, VII, 1909, the specimens found at Mogador by M. de la Escalera are said to belong to the typical form). Algeria and Tunis in the Sahara (Simon, 1908 a, p. 421 ; 1910, p. 287). Libya : Brach, Murzuch in Fezzan (di Caporiacco, 1936 b, p. 72) ; ? Sochna Oasis (Karsch, 1881, *Eresus dufouri*) ; Benghazi, Djebel Tegrinna (Simon, 1908 a, p. 421) ; Gialo (di Caporiacco, 1933, p. 315), Giarabub, El Auenát (di Caporiacco, 1936 a, p. 94) ; Ain Douà (di Caporiacco, 1936 a, p. 114). Egypt, in desert ; Red Sea (Simon, 1908 b, p. 79).

The typical form is to be met with in Spain, Syria, Sicily, Asia Minor, Mesopotamia, Egypt and Algerian Tell.

Remarks. — I think these two females, 12 and 13.5 mill. long, are correctly named, the dorsal black spots are exceedingly developed and united together in such a way that the upper face of the abdomen is entirely black with a posterior longitudinal white line beginning from the middle and reaching the spinnerets in the former, but not in the latter specimen. The white hairy covering is not conspicuous at all, but as in many other spiders in the lot, it may have been rubbed off.

15. Stegodyphus manicatus E. Simon 1876.

Stegodyphus manicatus E. Simon, Ann. Soc. Entom. Fr., (5) VI, 1876, Bull., p. LXXXVII.
Stegodyphus manicatus E. Simon, Bull. Soc. Entom. Egypte, I, 1908, p. 79.
Stegodyphus manicatus E. Simon, Ann. Soc. Entom. Fr., LXXIX, 1910, p. 288, fig. 4 c.

Localities. — Siwa, 18.IV, 1 ♀ subad., 2 juv. ; 29.IV, 1 ♂ (n. 232), 3 ♀♀, 2 juv. (n. 228-231) ; 20-30.V, 4 ♀♀ (n. 99-102) ; 20-30.VI. 2 ♂♂. 1 ♀ ; 12.VII, 1 ♀ (n. 149) ; 17.VII, 1 ♀ in a rolled leaf with her youngs already hatched, but still in the egg-cocoon (n. 278) ; 18.VII, 1 ♀ (n. 201) ; 8.VIII, 1 ♀ (n. 395) ; 4.IX, 3 juv. Koreishid, 29.VIII, a few young specimens (from tube n. 981-988). Abu Sheruf, 17.V, 1 juv. Sitra, 14-16.VI, 3 ♀♀ (n. 8-10), 1 ♀ (n. 1061). Exabaïa, 17.VIII, 1 ♀ (n. 870). Tarterad Hamid, 18.VIII, 1 ♀.

Distribution. — Egypt : Djebel Mokattam, near Cairo (Simon, 1908 b, p. 79 ; 1910, p. 288). Lower Abyssinia (Simon, 1876 a.).

Remarks. — Females belonging to this genus are very hard to distinguish from each other and, had there not been males in the lot, I should almost certainly not have determined these as *S. manicatus ;* none agrees well with any description, but it would be rather strange if males and females collected together in the same locality belonged to different species. They are from 11.5 to 18 mill. in length ; their median eyes are nearly equal in size, the posterior ones being a little (e.g. 0.22 against 0.20) but not twice larger than the anterior ones; there is neither spot nor oblique lines in front of the cephalothorax. As a rule the underside of the abdomen is of the same colour as the upperside except in a few specimens in which it is brownish (n. 149). Legs bear rings more or less distinctly marked, disposed as in *S. dufouri* (Aud.), but the most often these surround the joints entirely; even tibia III bears two rings; metatarsi are darker in but two specimens (n. 395 and n. 149); in this last one, the legs closely resemble those of *S. niloticus* E. Simon.

Fam. AGELENIDAE

16. Agelena lepida deserta di Caporiacco 1933.

(pl. I, fig. 2; pl. IV, fig. 1)

Agelena lepida deserta di Caporiacco, Ann. Mus. Genova, LVI, 1933, p. 337.

Localities. — Siwa, 29.IV-3.V, ? 3 juv. (from tube n. 247-256); 18.VII, 1 ♂ (n. 200). Siwa, Zegawa, 17.VII, 1 ♂ very damaged. Aghourmih salt marsh, 18.IV, 1 juv. Pond n. 47, Anas Yutra, 6.V, 1 ♀. Tarterad Hamid Bakour, 18.VII, 1 ♀.

Distribution. — Libya : Fezzan, Edri, Uadi Tanezzuft, Ferat, Serdeles (di Caporiacco, 1936 a, p. 88); El Gióf, Buema (di Caporiacco, 1936 b, p. 110); Gialo, Hatta Gur Atta near Gialo, Buma, El Hauari (di Caporiacco, 1933, p. 237).

Agelena lepida lepida O.P. Cambridge (*Proc. Zool. Soc.*, 1876, p. 558) is distributed as follows : Algerian Sahara (Simon, 1908 a, p. 434). Libya : Tripoli (Simon, 1908 a, p. 434); ? Sockna (Karsch, 1881, *A. pupia*, p. 10); Giarabub (di Caporiacco, 1928, p. 27); Brach, Gat, Edri, Uadi Tsein (di Caporaccio, 1936 a, p. 88). Egypt : Gebel y Silsilis (Cambridge, 1876); Bir Hooker (Simon, 1899 a, p. 244). Abyssinia : Daimbi in Scioa (Pavesi, 1883, p. 42); Aloi, Salolé (Pavesi, 1897, p. 168).

Remarks. — The abdominal pattern in the male agrees perfectly well with that of the subspecies *deserta*, legs are wholly yellow, but there are a few slight markings on the cephalothorax. In young specimens, the abdomen resembles that of the typical form, but the legs are wholly yellow.

Fam. PISAURIDAE

17. Rothus atlanticus E. Simon 1898 ?

Rothus atlanticus E. Simon, Ann. Soc. Entom. Belg., XLII, 1898, p. 14.

Locality. — Siwa, 4.VIII, 4 juv. (n. 341-344).

Distribution — Algeria, Tunis (Simon, 1898, p. 14). ? Abyssinia : Mole Thal (Strand, 1908 c, p. 47).

Fam. LYCOSIDAE

A few young specimens cannot be determined with certainty; these were brought back from Siwa (2 juv., 5.IX), Siwa, Pond n. 2 (1 juv., 22.IV), Maragi, Pond n. 54 (1 juv., 24.VI), Zeitoun (1 juv., 2.IX), Ilrhabit Reseur (10 juv., 11.V) and Gara (1 juv., 2.VII).

18. Lycosa ferox Lucas 1838.

(pl. I, figs. 3-5)

Lycosa ferox Lucas, Hist. Nat. Can., II, 1838, p. 26, pl. VI, figs. 13-14.
Trochosa xylina E. Simon, Aran. Nouv., 1r Mém., Liège, 1870, p. 87.
?*Lycosa effera* O. P. Cambridge, Proc. Zool. Soc., 1872, p. 318.
Lycosa andalusiaca E. Simon, Arachn. Fr., III, 1876, p. 254.

Locality. — Siwa, 20.IV, 1 ♂, 1 ♀ (n. 221-222); 10.VII, 1 ♂ (n. 267); 21.VIII, 1 ♂ (n. 492); 4.IX, 1 ♀ (n. 20), 6.IX, 2 ♂♂, 1 juv. (n. 643-645); 8.IX, 1 ♂.

Distribution. — Spain : Cartagena (Simon, 1870, p. 87, *Trochosa xylina*). Syria : Ataïbé, Damascus, Broumana (Gadeau de Kerville, 1926, p. 69); Beirût, Lebanon (Cambridge, 1872, p. 318). Palestine : Jericho, Hebron (*ibid.*). Egypt : Cairo, Alexandria (Cambridge, 1876, p. 601, *Trochosa effera*); Bir Hooker (Simon, 1899 a, p. 244), Libya : Derna (Simon, 1908 a, p. 434); Fezzan : Gat, Brach, Tunin (di Caporiacco, 1936 b, p. 88). Tunis : Tunis and neighbourhood (Pavesi, 1880, p. 373; 1884, p. 453; E. Simon, 1885, p. 9); Kerouan, Mehedia, Gabes (Simon, 1885). Algeria : between Laghouat and the inn of Metlili (Simon, 1899 b, p. 84); Western Algeria (Simon, 1883, p. 284). Morocco : Oudjda (Simon, 1911, p. 419). Canary Islands (Lucas, 1838, p. 26). Cape Verde Islands (Berland, 1936, p. 85). Fernando Poo Island (Simon, 1909 b, p. 395).

Reimoser (1919, p. 146) mentions this Spider from the South of France and Sardinia, an indication which I think is connected with *L. caliginosa* E. Simon, but this is not a synonym of *L. ferox*.

19. Lycosa urbana (O. P. Cambridge) 1876.

(pl. I, figs. 6-7)

Lycosa agretyca Audouin, Descr. Eg., Hist. Nat., I, 1825, p. 147, pl. 4, fig. 6.
Lycosa agretyca Audouin, Descr. Eg., Hist. Nat., 2e édi., XXII, 1827, p. 369.
Trochosa urbana O. P. Cambridge, Proc. Zool. Soc., 1876, p. 601, pl. LX, fig. 14.
Tarentula urbana Strand, Arch. f. Naturg., LXXVIII, 1907, p. 337.
Tarentula urbana Strand, Arch. f. Naturg., LXXIV, 1908, p. 49, pl. 2, fig. 19.
Tarentula urbana Strand, Wiss. Erg. Deutsch. Zentral-Afrika-Exp., Arachn., 1913, p. 430.
Lycosa urbana de Lessert, Revue Suisse Zool., XXIII, 1915, p. 61, pl. 3, figs. 69-71 and 76-78.

Localities. — Siwa, 18.IV, 1 juv. ; 20.IV, 1 ♂, 1 ♀, 1 juv. (n. 206-208), 1 ♂, 1 ♀, 1 juv. (n. 223-225), 1 ♂ subad., 1 ♀ subad. 4 juv. (n. 215-220) ; 29.IV-3.V, 1 ♀ subad., 1 juv. (n. 233-234) ; 20-28.V, 1 ♀ subad. (from tube n. 736-737) ; 20-30.VI, 1 ♀ subad., 2 juv. ; VII, 1 juv. (from tube n. 178-179) ; 10.VII, 1 juv. (n. 269) ; 18.VII, 1 juv. (n. 202), 1 juv. (n. 204) ; 21.VII, 1 juv. (n. 296), 1 ♂ subad. (n. 317), 3 ♂♂, 4 ♀♀, 2 juv. (n. 301-309), 1 ♂, 2 ♀♀, 4 juv. (n. 310-316), 7 juv. (n. 318-324) ; 22.VII, 1 ♀ subad. (n. 300) ; 7.VIII, 1 ♂, 4 ♂♂ subad., 10 ♀♀, one of them with her egg-cocoon, 4 ♀♀ subad., 40 juv. (n. 362-382) ; 13.VIII, 1 juv. (n. 421) ; 24.VIII, 3 ♀♀, one of them with her egg-cocoon, 3 ♀♀ subad., 9 juv. (n.527-534), 1 juv. (n. 514), 1 ♂ subad., 3 ♀♀, 3 ♀♀ subad., 4 juv. (n. 517-526), 1 ♀ subad. (n. 513) ; 27.VIII, 1 ♂ (n. 535), 2 ♂♂, 2 ♂♂ subad., 8 ♀♀, 4 ♀♀ subad., 30 juv. (n. 111-130), 1 ♂, 15 juv. (n. 14-19), 1 ♀ ; 28.VIII, 1 juv. (n. 546) ; 31.VIII, 1 ♂, 5 ♂♂ subad., 3 ♀♀, 3 ♀♀ subad., 42 juv. (n. 57-76), 1 juv. (n. 564), 1 ♀, 7 juv. ; 3.IX, 17 juv. (n. 600-609), 2 juv. (from tube n. 610-615), 1 ♂, 7 ♀♀, one of them with her egg-cocoon, 4 ♀♀ subad., 6 juv. (n. 616-630), 6 juv. (n. 594-599), 5 juv. (n. 589-593) ; 4.IX, 10 juv. (n. 22-29), 1 ♀ subad. (n. 631), 2 juv. (n. 33-34), 7 juv. ; 5.IX, 1 ♂ subad. ; 6.IX, 2 ♂♂, 1 ♂ subad., 5 ♀♀, three of them with their egg-cocoons and one with an empty egg-cocoon, 1 ♀ subad., 16 juv. (n. 633-642) ; 8.IX, 7 juv. (n. 659-664), 2 ♂♂, 4 ♀♀, 1 ♀ subad., 6 juv. (n. 670-675), 2 ♀♀ subad. (n. 666-667), 3 ♂♂, 1 ♂ subad., 2 ♀♀, 4 ♀♀ subad., 1 juv., 10.IX, 1 ♂ subad., 1 ♀, 1 ♀ subad. (n. 686-688), 1 ♀ (n. 689), 1 ♀, 7 ♀♀ subad., 4 juv. (n. 676-685), 1 ♀, 1 juv. Pond n. 9 Ultahu Hirfola, 10.V, 1 ♀ subad. Pond n. 47, Anas Yutra, 3.IX, 1 juv. ? Tarterad Hamid Bakour, 18.VII, 2 ♀♀, 1 juv.

Distribution. — Algeria : Tadmit, between Sidi Maklouf and Metlili (Simon, 1899 b, p. 85). Tunis : Gabes (Simon, 1885, p. 9). Fezzan : Gat, El Barcát, Mustafá, Scescine, Sebha (di Caporiacco, 1936 b, p. 88). Cyrenaica : ? Merg (di Caporiacco, 1934, p. 24). Egypt (Audouin, 1825, *Lycosa agretyca*) ; Alexandria (Cambridge, 1876, p. 601) ; Lower and Upper Egypt (Simon, 1884 b, p. 7). Anglo-Egyptian Soudan : Khartoum (Simon, 1884 b, p. 7) ; Kaha, Gebel Ahmed Aga (Simon, 1907 a, p. 8) ; Khor Attar, Mongalla (Simon, 1906, p. 12) ; Madi Bari and Niam-Niam countries (Simon, 1904, p. 443). Lake Victoria (Strand, 1913, p. 432, *Tarentula u.*). Lake Albert (*ibid.*, *Tarentula u.*, var.). Uganda (de Lessert, 1915, p. 61). Astove and Saint-Peter Islands (Hirst, sec. de Lessert, 1915, p. 65). Seychelles Islands (Simon 1897, p. 385). Abyssinia (Simon, 1901, p. 25) : Fecherié-Ghem, Let-Maréfia in Scisa (Pavesi, 1883, p. 68, *Trochosa u.*) ; Daroli (Strand, 1908 a,

p. 337, *Tarentula u.*). Erythraea : Ghinda (Kulczynski, 1901, p. 3); Dacanamo, Cedi Caié (Reimoser, 1937, p. 19, *Trochosa u.*). Arabia, northern India (Simon, 1897 a, p. 385).

This species is a very variable one in size and in colour, and a number of subspecies have been described from Morocco to Nossibé.

20. Arctosa ambigua spec. nov.

(pl. I, fig. 8)

Localities. — Siwa, 27.VIII, 2 ♀♀ cotypes (from tube n. 14-19). Sitra, 14.VI, 1 ♀ with her egg-cocoon. Pond n. 12, Ilrhabit Reseur, 11.V, 1 ♀.

Description. — ♀ 9.5 and 10 mill. long. Cephalothorax drab brown, darker at its margin, with a black, thick marginal line; a few paler irregular spots, by no means conspicuous, disposed near the margin; short blackish hairs, white on the sides; thoracic stria well marked, preceded by two very short, divergent striae behind the cephalic part. Eyes disposed on a black spot, the front line being nearly straight; antero-median eyes less than their diameter apart, antero-lateral eyes equal to 3/4 of this diameter; distance between antero-median and latero-median eyes equal to 1/3 of the diameter of the antero-median eyes; eyes of the second line large, a little more separated from each other than by their diameter, distance between middle eyes and antero-median eyes equal to 1/3 of this diameter; sternum rather light reddish brown, lip dark red-brown, maxillae paler, white at their end. Legs drab with brownish rings little or scarcely conspicuous; patella I without any spine, tibia I with one median and two apical lower spines and with one lateral anterior spine; patella II with a lateral anterior spine, tibia II with two apical lower and two lateral anterior spines; metatarsi I and II with 2.2.2 lower spines, more reddish than the other joints, as well as the tarsi; metatarsus IV nearly as long as patella + tibia. Abdomen blackish, much paler underneath; dorsal pattern very indistinct, at the anterior edge a drab spot with another much smaller on both sides, on the back four drab spots disposed into a square with two much smaller ones between them, a few transversal lines behind (these spots are inconspicuous in one specimen in which an anterior pale stripe is to be seen); epigyne drab, nearly entirely filled with a plate wider behind.

Male unknown.

Remarks. — I think this spider belongs to an undescribed species. Although its front eyes are disposed in a straight line, slightly narrower than the second one, with a very narrow clypeus, I prefer to regard it as an *Arctosa*, perhaps near *A. nilotica* (Aud.).

21. Arctosa cinerea (Fabricius) 1777.

Aranea cinerea Fabricius, Gen. Ins., 1777, p. 249.
Aranea cinerea Fabricius, Ent. Syst., 1793, p. 423.
Aranea allodroma Walckenaer, Faune Paris., II, 1802, p. 238.
Lycosa allodroma Walckenaer, Tabl. d. Aran., 1805, p. 13.
Lycosa allodroma Walckenaer, Hist. Nat. Aran., 1806, fasc. L, tab. 4.
Lycosa maculata Hentz, Monogr. Aran., 3, 1822, tab. III, fig. a.
Lycosa allodroma Walckenaer, Fn. Fr. Aran.,1825, p. 15, pl. 2, fig. 6.
Lycosa cinerea Sundevall, Vet. Akad. Handl., 1833, p. 190.
Lycosa lynx Hahn, Arachn., II, 1834, p. 13, pl. XLII, fig. 104.
Lycosa leucophaea Blackwall, London Edinb. Phil. Mag., (3) X, 1837, p. 104.
Lycosa allodroma Walckenaer, Apt., I, 1837, p. 330.
Lycosa allodroma C. L. Koch, Arachn., V, 1839, p. 106, pl. CLXXII, figs. 410-411.
Lycosa littoralis Hentz, Journ. Boston Soc. N. H., IV, 1844, p. 388, pl. XVII, fig. 9.
Lycosa maritima Hentz, ibid., 1844, p. 389, pl. XVII, fig. 10.
Lycosa pilipes Lucas, Expl. Alg., Arachn., 1846, p. 109, pl. II, fig. 8.
Arctosa cinerea C. L. Koch, Arachn., XIV, 1848, p. 123, pl. CCCLXXXVIII, fig. 1358.
Lycosa cinerea Westring, Aran. Suec., 1861, p. 523.
Lycosa allodroma Blackwall, Spid. Gr. Br., I, 1861, p. 23, pl. I, fig. 7.
Arctosa halodroma Ohlert, Ar. Preuss., 1867, p. 145.
Lycosa cinerea E. Simon, Ar. Fr., III, 1876, p. 278.
Arctosa cinerea Menge, Preuss. Sp. 1877, p. 516, pl. LXXXIV, fig. 292.
Trochosa cinerea O. P. Cambridge, Spid. Dorset, II, 1881, p. 545.
Lycosa cinerea Becker, Arachn. Belg., I, 1882, p. 107, pl. VIII, fig. 7.
Lycosa cinerea Emerton, Tarns. Connect. Acad. Sci., VI, 1885, p. 488, pl. XLVII, fig. 3.
Trochosa cinerea Chyzer et Kulczynski, Aran. Hung., I, 1891, p. 73, pl. 3, fig. 10.
Lycosa cinerea Emerton, Common Spid., 1902, p. 73, figs. 177-178.
Lycosa cinerea Montgomery, Proc. Acad. Philad., 1902, p. 555, pl. XXIX, figs. 17-18.
Arctosa cinerea Fr. Cambridge, Biol. Centr. Amer., II, 1902, p. 331, pl. XXXI, figs. 28-29.
Trochosa cinerea Bösenberg, Sp. Deutsch., 1903, p. 401, pl. XXXVIII, fig. 589.
Trochosa cinerea Montgomery, Proc. Acad. Philad., 1904, p. 305, pl. XX, fig. 43.
Lycosa cinerea Chamberlin, ibid., 1908, p. 281, pl. XX, figs. 5-6.
Arctosa cinerea Dalh, Die Lycos., 1908, p. 312, fig. 40.
Tarentula pilipes Strand, Arch. f. Naturg., LXXIII, 1908, p. 332, pl. VIII, fig. 26.
Lycosa (Trochosa) cinerea de Lessert, Cat. Ar. Suisse, 1910, p. 494.
Arctosa cinerea F. und M. Dahl, Tierw. Deutschl., V, 1927, p. 70, figs. 181-182.
Arctosa cinerea Roewer, Tierw. Mitteleur., Aran., 1929, p. 132, figs. 1492 and 1495.
Lycosa cinerea E. Simon, Arachn. Fr., VI (5), 1937, p. 1113, figs. 1748-1749.

Locality. — Sitra, 14-16.VI, 1 ♀ with her youngs newly hatched but still in the egg-cocoon (n. 1062).

Distribution. — A very widespread spider to be found throughout Europe, the whole Mediterranean region, North and Central America; also in Senegal (Simon, 1886).

Remarks. — *Arctosa pilipes* is said by E. Simon (1937, p. 1138) to be a large form common in Algeria, Tunis and Egypt. The present specimen is a very pale example of this form.

22. Arctosa quadripunctata (Lucas) 1846.

(pl. I, figs. 9-10)

Lycosa quadripunctata Lucas, Expl. Alg., Arachn., 1846, p. 119, pl. 4, fig. 1.
Tarentula quadripunctata Strand, Arch. f. Naturg., LXXIII, 1908, p. 325.

Localities. — Siwa, 29.IV-3.V, 2 juv. (from tube n. 247-256); 28.VIII, 2 juv. (n. 544-545). Shiata, 2.VIII, 4 ♂♂, 1 ♂ subad., 5 ♀♀, 6 juv. (n. 1034-1044), 2 juv. (n. 1045-1046). Aghourmih salt marsh, 18.IV, 1 juv., Abu Sheruf, 17.V, 1 ♂. Baharein, East Lake shore, 13.VI, 6 juv.

Distribution. — Algeria : Lake Tonga marsh, near La Calle (Lucas, 1846, p. 119). Tunis : Tabarca sand-hills (Gadeau de Kerville, 1908, p. 54); Gabès (Simon, 1885, p. 10; Strand, 1908 a, p. 325).

Remarks. — The anterior dark stripe is always conspicuous on the abdomen, but the four points are sometimes wanting (or at least seem to be so in more or less shrivelled specimens). The anterior row of eyes is not quite as wide as the second one, its median eyes are larger than the laterals, they are about their diameter apart in the male, a little less in the female. There is no spine on patella I, an anterior spine on patella II; first tibia and metatarsus bear, 2.2.2 lower spines, the apical ones being more lateral on the metatarsus; the tibial spines are rather irregular in the female, 2.2 or 2.1 as a rule. The underside of the abdomen is rather dark, the sternum yellow.

It is perhaps the specimens from Shiata Mr. Omer-Cooper has written about : « In the wet sand at the edge of the water live numbers of spiders which tunnel just below the surface ». These are in fact the only spiders brought back in number from Shiata.

23. Arctosa argentata spec. nov.

(pl. VI, fig. 1)

Locality. — Sitra, 14-16.VI, 1 ♀, 1 juv. (from tube n. 1058-1060).

Description. — ♀ 7 mill. long. Cephalothorax wholly yellow with a few drab hairs on the ocular area and a few isolated, long, black hairs on the sides of the ocular area and on the clypeus. Eyes widely circled with black; anterior eyes disposed into a nearly straight line, the median ones not quite their diameter apart, almost contiguous to the lateral ones which are equal in size; second line as wide as the first one, its eyes being separated by their diameter. Falces reddish drab sprinkled with long, black hairs, their lower margin bearing three brown teeth, the median one the largest, separated from the first one, but contiguous to the third one which is very small. Sternum yellow, maxillae and lip more coloured, the basis of the latter more brownish. Legs yellow; femur I with one upper spine and one anterior lateral one near its apex; patella I without any spine; tibia I with two short apical, lower spines and two submedian ones; patella II with an anterior lateral spine; tibia II with one apical anterior and three posterior lower spines, and two anterior lateral spines; metatarsus I with two apical lower spines and two posterior lateral ones; metatarsus II with one apical anterior and three posterior lower spines, two anterior and one posterior lateral ones; patellae III and IV with one spine on both sides. Abdomen grey-white, silver coloured on its upperside, with two blackish points, widely apart from each other near the middle, and four smaller ones in the posterior half; the median pair is much nearer the hind than the front one.

Male unknown.

Remark. — This spider seems to be nearly allied to the preceding one

24. Pardosa venatrix (Lucas) 1846.

(pl. I, figs. 11-13)

Lycosa venatrix Lucas, Expl. Alg., Arachn., 1846, p. 116, pl. 3, fig. 7.
Lycosa fidelis O. P. Cambridge, Proc. Zool. Soc., 1872, p. 319.
Lycosa galerita L. Koch, Aeg. u. Abyss. Arachn., 1875, p. 69, pl. VII, fig. 1.
Lycosa galerita E. Simon, Arachn. Fr., III, 1876, p. 269.
Lycosa venatrix Strand, Archiv. f. Naturg., LXXIII, 1907, p. 352.
Pardosa venatrix E. Simon, Arachn. Fr., VI (5), 1937, pp. 1059 and 1080, figs. 1637 and 1678.

Localities. — Siwa, 20-28.V, 1 ♂ subad., 1 ♀ (n. 766-767); 16-19.VIII, 1 juv. (n. 465); 27.VIII, 1 ♀ with her egg-cocoon containing newly hatched young (from tube n. 14-19); 28.VIII, 3 ♂♂, 2 ♂♂ subad., 3 ♀♀, 38 juv. (n. 547-559); 3.IX, 1 ♂, 1 ♂ subad., 3 ♀♀, 2 juv. (n. 610-615); 8.IX, 2 ♀♀. Abu Sheruf, 17.V, 1 ♀. Pond n. 54, Maragi, 24.VI, 1 ♀. Pond n. 61, Maragi, 26.VIII, 1 ♀. Baharein, East Lake shore, 13.VI, 1 ♀.

Distribution. — Portugal (Simon, 1937). Spain : Albaceta, Almuradiel, Cartagena (Simon, 1876 b, p. 271). France : departments adjoining the Mediterranean Sea, Var, Bouches-du-Rhône, Herault, Aude, Pyrénées-Orientales (Simon, 1937). Syria : Damascus, Berze (Gadeau de Kerville, 1926, p. 69); Beirût (Cambridge, 1872, p. 320). Palestine : Jericho (*ibid.*). Southern Yémen (Simon, 1882, p. 219) : Sheikh Osman (Simon, 1890 a, p. 112). India : Bombay (Cambridge, 1872, p. 320). Irak (sec. Reimoser, 1937).

Erythraea : Adī Caié, Adi Ugri, Saganeiti (Reimoser, 1937, p. 19). Abyssinia (Simon, 1901, p. 25) : Addis-Abeba (Strand, 1908 a, p. 353). Egypt : Suez (Simon, 1876 b, p. 271); Alexandria (Cambridge, 1876, p. 605), Bir Hooker (Simon, 1899 a, p 244); Cairo (Cambridge, 1872, p. 320; 1876, p. 605; L. Koch, 1875, p. 69; Simon, 1907 a, p. 9); Assuan (Simon, 1907 a, p. 9); Anglo-Egyptian Soudan : Khartoum, Omdourman (Simon, 1907 a, p. 9). Libya : Porto Bardia (di Caporiacco, 1928, p. 98); El Giof (di Caporiacco, 1933, p. 336; 1936 a, p. 111); Buema, Haret Haffún (di Caporiacco, 1936 a, p. 111); Derna (Simon, 1908 a, p. 336); El Feteya near Derna (di Caporiacco, 1934, p. 25); Elbarcát (di Caporiacco, 1936 b, p. 91). Tunis : Kessera (Simon, 1885, p. 12); Mohammedia (Pavesi, 1880, p. 370, *Lycosa fidelis*); Aïn Draham (Gadeau de Kerville, 1908, p. 54). Algeria : Algiers, Oran (Lucas, 1846, p. 116); Laghouat (Simon, 1899 b, p. 85).

Remarks. — This one appears to be a very variable spider; E. Simon describes it as having its cephalothorax « sans bandes longitudinales » (1876 b, p. 270) and its description has been written out from specimens seen by L. Koch whose drawing of *Lycosa galerita* (1875, pl. VII, fig. 1) shows both a wide median and divided lateral stripes, just as in the spiders from Siwa; these, I think, are rightly named, the male palp agrees tolerably well with L. Koch's figure which I fear has been drawn from a swollen specimen. In the spiders brought back by the Armstrong College expedition, the cephalothorax is dark brown with a wide yellowish median spot, somewhat rounded in shape, more or less festooned at its margin and not reaching the hind eyes; the lateral stripes are divided, rather indistinct in front, nearly undivided behind, they are sometimes lacking (n. 766-767); the ocular region is black; the anterior eyes are disposed as in Cambridge's description of *Lycosa fidelis*, but their row is slightly narrower than the second one; falces in some specimens are brown with their ends yellow and in others on the contrary, yellow with a very wide brown stripe at their apex; sternum black. On the legs, rings are very variable in colour intensity, sometimes nearly unconspicuous; when present, they are two in number on femora, besides a narrow basal one; patellae have a brown spot on each side; tibiae bear 2, metatarsi 2 indistinct rings; in the male the first femora are wholly brown, the palp agrees perfectly well in colour with the descriptions. The abdomen is yellowish with a lateral brown bordering in the anterior half; in front a longitudinal stripe tapering behind is flanked by two pairs of brown spots and does not reach the middle; in the hind half there are a few transverse brown lines, the first two well developed united at their ends so as to enclose a yellow spot, are followed by a much shorter one; the fourth extends a long way on the sides; the last one is reduced to a spot above the spinnerets; but all these markings are very variable and the back of the abdomen is sometimes almost wholly brown. The epigyne also varies in shape and is sometimes filled with a whitish matter which modifies its general appearance.

25. Pardosa injucunda (O.P. Cambridge) 1876.

Lycosa injucunda O. P. Cambridge, Proc. Zool. Soc., 1876, p. 605, pl. LX, fig. 15.
Pardosa injucunda de Lessert, Revue Suisse Zool., XXIII, 1915, p. 69, pl. III, figs. 86, 87, 89.

Localities. — Girba, 12.VIII, 1 ♂, 1 ♀ subad. (n. 885-886). Khamissa, 14.VIII, 2 ♀♀ with their egg-cocoons. Zeitoun, 29.VIII, 1 ♀.

Distribution. — Syria (E. Simon, 1906, p. 13). Libya : Derna (di Caporiacco, 1934, p. 25); Scescine, Uadi Tseien, Feúat, Tunin, Tin Geraben, Gat, Mustafa (di Caporiacco, 1936 b, p. 91). Egypt : Alexandria, Cairo (O.P. Cambridge, 1876, p. 605). Anglo-Egyptian Soudan : Khor Attar (Simon, 1906, p. 13). Kenia : Bukoba near Lake Victoria (de Lessert, 1915, p. 71). Tanganyka : Kibonoto near Kilimandjaro (de Lessert, 1926, p. 348). Belgian Congo : Faradje (de Lessert, 1927, p. 411).

Reimoser (1919, p. 154) mentions this spider from Abyssinia, I do not know which is the original reference.

26. Evippa ungulata (O. P. Cambridge) 1876.

(pl. I, fig. 14)

Lycosa ungulata O. P. Cambridge, Proc. Zool. Soc., 1876, p. 603.
Evippa ungulata Strand, Arch. f. Naturg., LXXIII, 1907, p. 368, pl. VIII, fig. 13.

Locality. — Gagub, 17. VIII, 1 ♀ with her egg-cocoon (n. 871).

Distribution. — Yemen : Sceik Osman (Simon, 1882, p. 223; 1890 a, p. 112). Egypt : Jebel y Silsilis (Cambridge, 1876); Thebes, Assuan (Simon, 1882, p. 223). Libya : El Guarscia (di Caporiacco, 1934, p. 26); Umm el Abid, Temenhint, Ubari near Serdeles, Murzuck, Fenát, Mustafá, Uadi Tanezzuft, Gat, Tin Geraben (di Caporiacco, 1936 b, p. 91); Uadi el-Gazál (di Caporiacco, 1936 a, p. 118). Tunis : Tunis, Ghand Ou N'Sa (Strand, 1907, p. 368). Algeria : Hammadena, Tougourt-Ouargla (*ibid.*).

Remarks. — The only specimen has on its cephalothorax markings on account of which I think it belongs to *E. ungulata* rather than to Audouin's species, *E. arenaria;* its abdomen is somewhat shrivelled and its epigyne looks more like that of *Evippa africana* Strand than that attributed by Strand to *E. ungulata.*

Fam. OXYOPIDAE

27. Peucetia arabica E. Simon 1882.

(pl. I, fig. 15)

Peucetia arabica E. Simon, Ann. Mus. Genova, XVIII, 1882, p. 216.
Peucetia arabica E. Simon, Hist. Nat. Ar., 2e éd., II (2), 1898, p. 372, fig. 371 D.

Locality. — Siwa, 4. IX, 1 ♀ (n. 21).

Distribution. — Greece : Symi (Bristowe, 1934, p. 771). Yemen :

Aden (Simon, 1882; 1890 a, p. 113); Hodeida, Djebel Milhan (Simon, 1890 a, p. 113). Abyssinia: Hanacio (Pavesi, 1897, p. 179); Dagota Valley (Simon 1904, p. 444). Egypt: Djebel Ataka near Suez (Simon, 1890, p. 113); Cairo (Simon, 1907 a, p. 9). Anglo-Egyptian Soudan: Omdurman (*ibid.*). Libya: El Auenát (di Caporiacco, 1936 a, p. 118).

28. Oxyopes spec.

A number of underterminable specimens belong to this genus.

Locality. — Siwa, 29.IV-3.V, 1 juv. (n. 244-246); 20-28.V, 1 juv. (from tube n. 782-791), 1 juv. (from tube n. 792-801); 20-30.V, 1 ♂ subad. (n. 113), 2 juv. (from tube n. 134-138). El Arig, 18.VI, 1 juv. bitten by an Ant (n. 858).

Fam. ZODARIIDAE

29. Zodarion pileolonotatum J. Denis 1935.

Zodarion pileolonotatum J. Denis, Ann. Mus. Civ. St. Nat. Genova, LVII, 1935, p. 102, pl. VII, figs. 4-6.

Localities. — Siwa, 3.IX, 1 ♀ subad. (n. 586); 5.IX, 1 ♀. Tarterad, 18.VII, 1 ♀ (n. 838).

Distribution. — Libya: Giarabub (di Caporiacco, 1928, p. 90. *Z. isabellinum*; Denis, 1935).

Remark. — This species is coloured in such a way that it is easily recognizable from all its congeners, even if not adult, which is an exceptional condition in the genus *Zodarion*.

Fam. THERIDIIDAE

30. Argyrodies ammonia spec. nov.

(pl. II, figs. 1-3)

Locality. — Near Khamissa, 7.IX, 1 ♂ (n. 977).

Description. — ♂ 2 mill. long. Cephalothorax red-drab with a black marginal line, its anterior part divided into two thick lobes, the upper one the thickest being slightly flattened at its upper part, the lower one being irregularly notched along the cleft cutting the head; the median eyes are equally separated from each other, i.e. nearly by the diameter of the anterior ones, but these are much larger than the posterior ones. Sternum brown, darker at its margin. Falces light drab. Legs yellow. Palp yellow with its tarsus light red-brown, the apex of the latter is divided into two large, obtuse lobes. Abdomen higher than long, black and very pale brownish, with two lateral silver spots and another, rather irregular, upper one; epigastric plate square, brown with a rather indistinct blackish T upside down;

underside of the abdomen brown with a few silver spots, small and irregular in front, followed by two larger ones; spinnerets dark brown.

Female unknown.

Remarks. — This spider is nearly allied to *Argyrodina gibbosa* (Lucas) which is widespread in the Mediterranean region and throughout a great part of Africca and Asia; but it more resembles *A. samoensis* (O. P. Cambridge); the lower lobe of its head is in fact thicker than in the former; as the upper lobe is very regular in its outline, I do not think the identations of the lower one the result of a shrivelling effect owing to spirit.

31. Euryopis quinqueguttata Thorell 1875.

Euryopis quinqueguttata Thorell, Horae Soc. Entom. Ross., XI, 1875, p. 68.
Euryopis quinqueguttata Thorell, Svenska Akad. Handl., XIII, 1875, p. 59.
Euryopis argenteomaculata E. Simon, Bull. Soc. Zool. Fr., 1879, p. 252.
Euryopis quinquenotata E. Simon, Bull. Soc. Entom. Fr., 1880, p. CVIII.
Euryopis argenteomaculata E. Simon, Arachin. Fr., V (1), 1881, p. 126, pl. 26, fig. 3.
Euryopis argenteomaculata Chyzer et Hulczynski, Aran. Hung., II, 1894, p. 21, tab. I, fig. 15.
Euryopis argenteomaculata Bösenberg, Spin. Deutchl., 1903, p. 121, tab. 11, fig. 154.
Euryopis argenteomaculata de Lessert, Cat. Ar. Suisse, 1910, p. 95.
Euryopis quinqueguttata (quinquenotata lapso) E. Simon, Arachn. Fr., VI (1), 1914, p. 247.
Euryopis quinquenotata Roewer, Tierw. Mitteleur., Arachn. VI, 1929, p. 55, figs. 627-628.
Euryopis quinqueguttata Wiehle, Tierw. Deutschl., XXXIII, 1937, p. 133, figs. 20-24.

Locality. — Siwa, 20-30.VI, 1 ♀.

Distribution. — France : La Varenne, Précy (Simon, 1881; 1914, p. 292); Chantilly, Bouray, Etampes, Malesherbes, Nemours (Simon, 1914, p. 292); Fontainebleau, Gyé-sur-Seine, les Riceys (Simon, 1881; 1914, p. 292); forêt d'Othe (Simon, 1914, p. 292); Ré Island, Aurillac, Rodez (Simon, 1881; 1914, p. 292). Switzerland : Lavigny in Vand (de Lessert, 1910). Italy : Monte Brócul (di Caporiacco, 1926, p. 82); Sicily (Simon, 1880 d). Germany : Nassau, Ahr Valley, Enzberg, Erlangen (Wiehle, 1937). Hungary : Budapest (Chyzer et Kulczynski, 1894). Yugo-Slavia (*sec.* Wiehle, 1937). Greece : Eubœa, near Steni (Simon, 1884 a, p. 332, *E. argenteomaculata*), Salonika (Simon, 1916, p. 274). Russia : Odessa (Thorell, 1875 a, 1875 b); Simferopol (Thorell, 1875 a); Don country (*sec.* Wiehle, 1937). Asia Minor : Serai-Dagh (Nosek 1905, p. 3).

Remarks. — If correctly named, this species is a new one for Africa; I am, however, a little doubtful about the correctness of this determination, because the legs are wholly yellow in the female from Siwa, and the epigyne is too variable to give a sure indication.

32. Theridion spec.

5 juv. quite undeterminable from Baharein, East Lake shore, 13.VI (M. Cameron).

33. Theridion aulicum C.L. Koch 1838.

Theridion aulicum C. L. Koch, Arachn., IV, 1838, p. 115, fig. 323.
Theridion rufolineatum Lucas, Expl. Alg., Arachn., 1846, p. 260, pl. XVI, fig. 10.
Theridion elegans Blackwall, Ann. Nat. Hist., (3) IX, 1862, p. 376.
Theridion spirifer O. P. Cambridge, Zoologist, 1863, p. 8574.
Theridion concinnum Blackwall, J. Linn. Soc., X, 1870, p. 424, pl. XVI, fig. 10.
Theridion delicatulum Blackwall, ibid., 1870, p. 428, pl. XVI, fig. 11.
Theridion spirifer O. P. Cambridge, Trans. Linn. Soc., XXVIII, 1872, p. 445, pl. XXXIII, fig. 9.
Theridion rufolineatum Thorell, Svenska Akad. Handl., XIII, 1875, p. 52.
Theridion rufolineatum O. P. Cambridge, Spid. Dorset, I, 1879, p. 89.
Theridion aulicum E. Simon, Arachn. Fr., V (1), 1881, p. 95.
Theridium aulicum Bösenberg, Sp. Deutschl., 1903, p. 108, pl. IX, fig. 135.
Theridion aulicum E. Simon, Arachn. Fr., VI (1), 1914, p. 262.
Theridium aulicum Wiehle, Tierw. Deutschl., XXIII, 1937, p. 139, figs. 41-43.

Locality. — Siwa, 29.IV-3.V, 1 ♂, 1 ♂ subad. (from tube n. 247-256); 20-28.V, 1 ♂, 1 juv. (from tube n. 792-801); 7.VIII, 1 ♂ (from tube n. 362-382); 15.VIII, 1 ♀ subad. (n. 447).

Distribution. — A very common spider throughout the whole Mediterranean region, reaching Brittany in France, England and Germany; Madeira, Canary Islands, Senegal.

34. Theridion tuberculatum Kroneberg 1875.

Theridium tuberculatum Kroneberg, *in* A. Fedchenko's Puteshestvie v Turkestan, Arachn., 1875, p. 9, pl. V, fig. 10.
Theridion dromedarius E. Simon, Ann. Soc. Entom. Fr., (5) X, 1880, Bull., p. XCIV.
Theridion palustre Pavesi, Ann. Mus. Genova, XV, 1880, p. 328.

Locality. — Siwa, 20-28.V, 1 ♀ (from tube n. 769-774).

Distribution. — Turkestan (Kroneberg, 1875). Yemen : Cheikh Othman (Simon, 1890 a, p. 95, *Th.dromedarius*). Egypt : Suez (Simon, 1890 a, p. 95), Alexandria, Ismaïlia (Simon, 1880 b). Libya : Giarabub (di Caporiacco, 1928, p. 91, *Theridula dromedaria*), Gialo, Hattia di Gur Atta (di Caporiacco, 1933, p. 322, *Theridula dromedaria*), Tripoli (Simon, 1908 a, p. 427, *Theridion dromedarius*). Tunis : Sfax, Gabes (Simon, 1885, p. 25, *Th. dromedarius*), Chekli Island in El Bahira (Pavesi, 1880). Algeria : Bone (Simon, 1885, p. 25, *Th. dromedarius*). Morocco : Mogador (Simon, 1909 a, p. 22, *Th. dromedarius*). Madeira, Canary Islands (Simon, 1908 a, p. 427, *Th. dromedarius*).

Fam. ARGIOPIDAE

35. Tetragnatha nitens (Audouin) 1825.

Eugnatha nitens Audouin, Descript. Eg., Hist. Nat., I, 1825, p. 118, pl. II, fig. 2.
Eugnatha nitens Audouin, ibid., 2e éd., XXII, 1827, p. 323.
Tetragnatha gracilis Lucas, Hist. Nat. Canaries, II, Entom., 1839, p. 43, pl. VI, fig. 8.
Tetragnatha nitens Walckenaer, Apt., II, 1842, p. 209.
Deinagnatha Daindridgei White, ap. Dieffenbach, Trav. in N. Zealand, 1843, p. 271.
Deinagnatha Daindridgei White, Ann. Mag. Nat. Hist., 1846, p. 180, pl. 2, fig. 5.
Tetragnatha deinagnatha Walckenaer, Apt., IV, 1847, p. 478.
Tetragnatha nitens Keyserling, Verh. Zool. bot. Ges. Wien, XV, 1865, p. 845, pl. XXI. figs. 1-4.
Tetragnatha ferox L. Koch, Arachn. Austr., I, 1872, p. 173, pl. XIV, figs. 4-5.
Tetragnatha gulosa L. Koch, ibid., 1872, p. 176, pl. XIV, fig. 6, and pl. XV, fig. 1.
Tetragnatha molesta O. P. Cambridge, Proc. Zool. Soc., 1872, p. 295.
Tetragnatha nitens E. Simon, Arachn. Fr., I, 1874, p. 159, pl. II, fig. 14.
Tetragnatha ejuncida E. Simon, ibid., 1874, p. 160.
Tetragnatha nitens Keyserling, Arachn. Austr., II, 1887, p. 223.
Tetragnatha typica Urquhart, Tr. N. Zealand Inst., XXII, 1889, p. 251, pl. 17, figs. 6-7.
Tetragnatha gulosa E. Simon, Zool. Jahrb., XXI, 1905, p. 416.
Tetragnatha nitens Strand, Rev. Suisse Zool., XVI, 1908, p. 350.
Tetragnatha ferox crossae Hogg, Proc. Zool. Soc., 1911, p. 300, fig. 92.
Tetragnatha nitens E. Simon, Arachn. Fr., VI (3), 1929, p. 645, figs. 994-995.

Localities. — Siwa, 20-28.V, 2 ♂♂, 2 juv. (n. 733-735). Ilrhabit Uncorde, 18.VII, 2 ♀♀ (n. 894-895). Khamissa, 22.VI, 1 ♀ (n. 915).

Distribution. — A very widely spread spider throughout the Mediterranean region and Africa, reaching Australia, New Zealand, Society Islands, Fiji, Marquesas Islands, etc.

36. Argiope clarki Blackwall 1865.

(pl. II, fig. 4)

Argiope clarkii Blackwall, Ann. Nat. Hist., (3) XVI, 1865, p. 98.
Argiope sericea caboverdiana Brito Capello, Journ. Ac. Sci. Lisboa, I, 1866, p. 82, pl. II, fig. 1 f.
Argiope lordii O. P. Cambridge, Proc. Zool. Soc. 1870, p. 820, pl. I, fig. 1.
Argiope fissiloba L. Koch, Aeg. Abyss. Arachn., 1875, p. 15, pl. II, fig. 1.
Argiope clarkii Pocock, Liverpool Mus., Rep. Sokotra Exped., 1903, p. 188, pl. XIV, fig. 3.

Localities. — Siwa, 20-28.V, 1 juv. (n. 729); 20-30.V, 2 juv. (n. 111 and 112); VI, 1 ♀ subad. (n. 159); 20-30.VI, 1 juv.; 9.VII, 1 ♀, 1 juv. (n. 160-161); 11.VII, 1 ♀, 1 ♀ subad., 1 juv. (n. 168-170), 1 ♀ subad., 1 juv. (n. 808-809); 13.VII, 1 ♂ subad., 1 ♀, 1 juv. (n. 164-165); 18.VII, 1 ♀, 1 juv. (n. 166); 26-28.VII, 2 ♀♀ (n. 162-163); 1.VIII, 1 ♀ (n. 174) 6.VIII, 1 ♀ (n. 167); 11.VIII, 1 ♀ (n. 172); 13.VIII, 1 ♂ (n. 426); 16-

19.VIII, 2 juv. (n. 449-450); VIII, 1 ♀ (n. 171); 2.IX, 1 ♀ (n. 174). Pond n. 54, Maragi, 24.VI, 1 ♀, 1 ♀ subad. Pond n. 19, Ilrhabit Uncorde, 29.VI, 2 ♀♀. El Arig, 7-8.VI, 2 juv. (n. 860 and 861). Shiata, 2.VIII. 11 ♀♀, 9 ♀♀ subad., 14 juv. (n. 995-1019). Khamissa, 4.V, 1 juv. (from tube n. 133-134); 5.VIII, 1 ♀ (from tube n. 954-958).

Distribution. — There is some uncertainty about the exact geographical distribution of this spider since another one was thought by E. Simon to be *A. clarki;* hence some confusion results.

Arabia (Simon, 1902, p. 252, *A. lordi*, Pocock 1903) : borders of the Red Sea, Aden (Simon, 1890 a, p. 101, *A. lordi*); Dibba on the Persian Gulf (Simon, 1902, p. 252, *A. lordi*); Bushire in Iran (Pocock, 1903). Sokotra, Abd-el-Huri (Pocock, 1903). Erythraea : Massawah (Cambridge, 1870; Kulczynski 1901, p. 3, *A. lordi*); Moncullo (Kulczynski, 1901, p. 3). Abyssinia : Habab (L. Koch, 1875); Agaos, Scioa (Pavesi, 1883, p. 10, *A. lordii*); Bogas (*ibid.*, p. 98); neighbourhood of Harar, Sidomo Country, Mount Fické, Anton River (Simon, 1904, p. 443, *A. lordi*). Anglo-Egyptian Soudan : White Nile (Simon, 1907 a, p. 6, *A. lordi*). Egypt : Port-Saïd (Pavesi, 1883). Tunis : Ksar el Metameur (Simon, 1885, p. 21, *A. lordi*). Algeria : Biskra (Simon, 1885). Capo Verde Islands (Blackwall, 1865). Senegal (Simon, 1886, p. 367, *A. lordi*).

Remarks. — It is rather surprising that this species has not yet been found in the Italian part of Libyan Desert and I wonder whether it has not been occasionally misnamed *A. lobata* (Pallas), a much commoner spider in the Mediterranean region, the epigyne of which is quite different (pl. II, fig. 5) and very variable in shape (see Kolosvary, 1937).

37. **Metargiope trifasciata (Forskäl) 1775.**

Aranea trifasciata Forskäl, Descr. Anim., etc., 1775, p. 86, pl. XXIV.
Aranea fastuosa Olivier, Encyclop. Méthod., 1791, p. 202.
Argyope aurelia Audouin, Descr. Eg., Hist. Nat., I, 1825, p. 122, pl. II, fig. 5.
Argyope aurelia Audouin, ibid., 2e éd., XXII, 1827, p. 331.
Epeira webbi Lucas, Hist. Crust. Arachn. Myriop., 1840, p. 38, pl. VI, fig. 5.
Epeira nephoda Walckenaer, Apt., II, 1842, p. 74.
Epeira aurelia Walckenaer, ibid., 1842, p. 107 (ad p.).
Epeira latreilla Walckenaer, ibid., 1842, p. 108.
Epeira mauricia Walckenaer, ibid., 1842, p. 108.
Epeira fastuosa Walckenaer, ibid., 1842, p. 109.
Epeira argyraspides Walckenaer, ibid., 1842, p. 110.
Epeira fasciata Hentz, Journ. Boston Soc. N. H., V, 1847, p. 468, pl. XXX, fig. 5.
Epeira flavipes Nicolet, Gay's Hist. Chile, III. 1849, p. 493.
Epeira mauritia Vinson, Aran. Réun., etc., 1863, p. 194, pl. VIII, fig. 2.
Argyopes plana L. Koch, Zool. bot. Ges. Wien, XVII, 1867, p. 181.

Argiope fasciata L. Koch, Arachn. Austr., II, 1872, p. 133, pl. X, fig. 5.
Epeira fasciata Hentz, Spid. U.S., 1875, p. 107, pl. XII, fig. 8, and pl. XXI, fig. 2.
Argiope sticticalis O. P. Cambridge, Proc. Zool. Soc., 1876, p. 576.
Argiope hentzi Thorell, 1878 (?).
Argiope fasciata Mc Cook, Proc. Acad. Philad., 1882, p. 256.
Argiope transversa Emerton, Trans. Connect. Ac. Sci., VI, 1885, p. 350, pl. XXIV, fig. 20. and pl. XXVIII, figs. 15-18.
Argiope argyraspis Mc Cook, Amer. Spid., III, 1893, p. 219, pl. XV, fig. 8, and pl. XVI. figs. 3-4.
Argiope transversa Emerton, Common Spid., 1902, p. 197, figs. 455-458.
Metargiope trifasciata F. Cambridge, Biol. Centr. Amer., II, 1903, p. 451, pl. XVIII, figs. 2-3.
Metargiope trifasciata Tullgren, Schwed. Exp. Kilimandj., XX, 1910, p. 156, pl. IV, fig. 93.

Localities. — Siwa, 20-30.VI, 1 ♂, 1 ♀, 1 ♀ subad., 1 juv.; 11.VII, 1 ♀ (from tube n. 168-170); 20.VIII, 1 ♀ (n. 173). Khamissa, 22.VI, 2 ♀♀, 1 ♀ subad., 3 juv. (n. 916-921), 3 ♂♂. 3 ♂♂ subad., 5 juv. (n. 922-931), 2 ♂♂, 1 juv. (n. 909-911). 3 ♀♀, 2 juv. (n. 904-908); 5.VIII, 3 ♂♂, 6 ♀♀ (n. 945-953), 1 ♂, 2 ♀♀, 1 ♀ subad. (n. 954-958). Near Khamissa, 7.IV, 1 ♀ (n. 965). Shiata, 2. VIII, 6 ♂♂, 3 ♂♂ subad., 5 juv. (n. 1023-1033), 1 juv. (n. 1051). El Arig, 7-8.VI, 1 juv. (n. 863). Koreishid, 29.VIII, 1 ♀, 1 ♀ subad. (n. 979-980). Abu Sheruf, 17.V, 1 ♀; 29.VIII, 1 ♀ (n. 7). Girba, 11.VIII, 3 ♀♀ (n. 879-881); 12.VIII, 2 ♀♀ (n. 883-884). Baharein, 7.VI, 3 ♀♀ subad. (n. 843-845). Pond n. 54, Maragi, 24.VI, 1 ♂, 2 ♀♀ subad.

Distribution. — A spider widespread throughout the tropical and subtropical regions of the world.

38. Cyrtophora citricola (Forskäl) 1775.

Aranea citricola Forskäl, Descr. Anim., etc., 1775, p. 86, pl. XXVI, fig. D.
Epeira opuntiae L. Dufour, Ann. Sc. Phys., V, 1820, p. 355, pl. LXIX, fig. 3.
Epeira cacti-opuntiae Lucas, Hist. Nat. Canaries, Arachn., 1838, p. 46, pl. VI, fig. 7.
Epeira opuntiae Walckenaer, Apt., II, 1842, p. 140, pl. XVIII, fig. 2 D and d.
Epeira citricola Walckenaer, ibid., 1842, p. 143.
Epeira emarginata Lucas, in J. Thompson, Arch. Entom. A, 1858, p. 42, pl. XII, fig. 5.
Epeira flava Vinson, Aran. Réun., etc., 1863, p. 222, pl. VIII, fig. 3.
Epeira opuntiae E. Simon, Aran. Nouv., 1er mém., Liège, 1871, p. 46.
Cyrtophora sculptilis L. Koch, Arachn. Austr., I, 1872, p. 128, pl. IX, fig. 9.
Cyrtophora opuntiae E. Simon, Arachn. Fr., I, 1874, p. 34, pl. I, fig. 3.
Cyrtophora citricola E. Simon, Hist. Nat. Ar., I (4), 1895, p. 770, fig. 845.
Epeira (Cyrtophora) citricola Thorell, Spid. Burma, 1895, p. 172.
Araneus citricola Pocock, Fauna Brit. India, Arachn., 1900, p. 226, fig. 73.
Cyrtophora citricola Tullgren, Schwed. Exp. Kilimandj., XX, 1910, p. 158, pl. IV, fig. 96.
Cyrtophora citricola E. Simon, Arachn. Fr., VI (3), 1929, p. 712.

Localities. — Sitra, 14-16.VI, 1 ♀ (n. 11). Girba, 12.VIII, 2 ♂♂, 1 ♂ subad. (n. 888-890). Khamissa, 5.VIII, 1 ♀. Tarterad Hamid Bakour, 18.VII, 1 juv. Gagub, 17.VIII, 6 ♀♀.

Distribution. — This spider inhabits the southern part of the Mediterranean region, but it reaches the provinces of Gerona and Barcelona in Corsica and Spain, it is also to be found in a great part of Africa, Arabia, India, Ceylon, the Malay Archipelago, Indo-China and Australia. A part of the synonymy pointed out in Simon's « Histoire naturelle des Araignées » (*C. angolensis* Brito Capello, *C. chinchoxensis* Karsch) concerns *Cyrtophora gabonensis* (Lucas), a species which is besides found with *C. citricola* in the Congo.

39. Cyclosa insulana (A. Costa) 1834.

Epeira insulana A. Costa, Cenni Ann. Zool., 1834, p. 65.
Epeira trituberculata Lucas, Expl. Alg., Arachn., 1846, p. 248, pl. XV, fig. 4.
Cyrtophora argentea Ausserer, Verh. Ges. Wien, XXI, 1871, p. 821, pl. V, fig. 8.
Cyclosa trituberculata E. Simon, Arachn. Fr., I, 1874, p. 43.
Cyclosa propinqua E. Simon, Ann. Mus. Genova, XVIII, 1882, p. 230.
Cyclosa insulana E. Simon, Arachn. Fr., VI (3), 1929, p. 708.

Locality. — Siwa, without any date, 1 ♀ (n. 1074) ; 29.IV-3.V, 1 ♀ (from tube n. 244-246).

Distribution. — Corsica, Giglio Island, Corfu, Southern part of the Mediterranean region, a great part of Africa and tropical Asia.

40. Larinia chloreis (Audouin) 1825.

(pl. II, fig. 6)

Epeira chloreis Audouin, Descr. Eg., Hist. Nat., I, 1825, p. 133, pl. III, fig. 5.
Larinia chloreis E. Simon, Sitz.-ber. Akad. Wiss. Wien, CXV, 1906, p. 1163.

Localities. — Shiata, 2.VIII, 1 ♂ subad., 4 ♀♀, 6 juv. (n. 1052-1057). Khamissa, 14.VIII, 1 ♂ subad., 1 ♀ subad.

Distribution. — Palestine : Akka (Audouin, 1825). Upper Egypt (Cambridge, 1876, p. 576). Anglo-Egyptian Soudan : Khor Attar, Mongalla, Gondokoro (Simon, 1906) ; between Doufile and Dougou River (Simon, 1904, p. 443. It is, I think, the latter reference de Lessert alludes to when indicating this species from the Congo basin ; 1930, p. 638). Libya : El Gióf (di Caporiacco, 1936 a, p. 102) ; Aïn Zara (Simon, 1908 a, p. 429).

Remarks. — This species appears to be rather variable in colour. As a rule the cephalothorax is of a uniform hue, but in one specimen there is an abridged, brownish, median line, and in another one this line is much longer, extending from the hind edge of the thorax and spreading over about two-thirds of the cephalic part, thus far from reaching the hind eyes. The abdomen is of a very pale brownish hue; on its dorsal face, it bears a longitudinal median series of minute, black points, and on both sides another series of points much farther from each other; on the hind part, there are four longitudinal, brownish lines, the two outer ones overreaching the last points of the lateral series; the two inner ones are shorter and begin in front in the angle of an inverted V preceded by a lengthened cross; on both sides of these four lines are two points. This pattern is more or less conspicuous in its different parts some of which are sometimes lacking; in one specimen moreover there is an obtusely-toothed folium surrounding the preceding one and in addition a median succession of lozenges; this folium somewhat resembles that of *Larinia trifida* Tullgren. The under side and the circumference round the spinnerets have reticulate white markings; this white space is bordered with brown and divided around the spinnerets into four large spots. The epigyne is variable also and I fear I have not chosen the most representative one for illustration.

41. Larinia acuticauda E. Simon 1906.

Larinia acuticauda E. Simon, Sitz.-ber. Akad. Wiss. Wien, CXV, 1906, p. 1164.

Localities. — Siwa, 20-30.VI, 1 ♂ subad., 1 juv. Girba, 11.VIII, 1 ♂ subad. (n. 882), 1 ♀ subad., 1 juv. (n. 887). Exabaña, 17.VIII, 1 ♂ subad. (n. 869). Baharein, 17.VI, 7 juv. (n. 848-853). Khamissa, 22.VI, 1 juv. (n. 933); 5.VIII, 1 juv. (n. 964).

Distribution. — Anglo-Egyptian Soudan : Khor Attar (Simon, 1906)

Remarks. — Although no adult specimen was collected, I think that this long-tailed species is correctly identified.

42. Larinia ovata spec. nov.

(pl. II, figs. 7-9)

Localities. — Siwa, 4.VIII, 2 ♂♂, 5 ♂♂ subad., 3 ♀♀, 27 juv. (n. 354-361). Sitra, 14-16.VI, 1 ♀, 1 ♀ subad. (n. 1063-1064).

Description. — ♀ length 6 to 7.5 mill., ♂ 5 mill. Cephalothorax yellowish with fine, white hairs. Anterior eyes disposed in a straight row, the medians the largest, separated from one another by three times their radius, a little less from the laterals; posterior eyes disposed in a recurved row; diameter of the antero-lateral and of the postero-median eyes equal to 5/6 the diameter of the antero-median ones; distance between postero-median eyes equal to half their diameter, distance between postero-median and postero-lateral eyes equal to 2 1/2 this diameter. Falces, maxillae and lip yellow, the latter with a bright red-brown edge. Legs yellow with white spines raising from red-brown points. Sternum yellow with white spots, sometimes stained with blackish. Abdomen oblong-oval, slightly wider at its anterior part (at least in the female), its front edge pointed, its posterior edge only just overreaching the spinnerets; with reticulate white markings and a broken, angular, scarcely conspicuous, blackish line at the widest place: at the hind part a nearly rubbed out folium is reduced as a rule in two parallel, rather sinuous, blackish lines, underneath, there are two widely distant, blackish lines and the colour is often darker between; spinnerets yellow.

43. Araneus spec.

Two young specimens from Zeitoun (2.IX) and Ilrhabit Uncorde, pond n. 19 and drains (18.V).

44. Araneus dalmaticus (Doleschall) 1852.

Epeira dalmatica Doleschall, Sitz.-ber. Akad. Wien, IX, 1852, p. 648.
Epeira impedita L. Koch, Verh. Zool. bot. Ges. Wien, XVII, 1867, p. 859.
Epeira illibata E. Simon, Ar. Nouv., 1^er^ mém., Liège, 1871, p. 44.
Epeira dalmatica E. Simon, Arachn. Fr., I, 1874, p. 68.
Epeira limans Thorell, Tijdschr. Ent., XVIII, 1875, p. 81.
?*Epeira radulans* Pavesi, Ann. Mus. Genova, XX, 1883, p. 11.
Epeira dalmatica Chyzer et Kulczynski, Aran. Hung., I, 1892, p. 129, pl. V, fig. 16.
Araneus dalmaticus de Lessert, Cat. Ar. Suisse, 1910, p. 312, fig. 169.
Araneus dalmaticus E. Simon, Arachn. Fr., VI (3), 1929, p. 696, figs. 1078-1079.

Locality. — Siwa, 29.VII, 1 ♀ (n. 355).

Distribution. — This spider inhabits the Mediterranean region as far north as Tessin in Switzerland, Transcaucasia and the borders of the Red Sea.

44a. Araneus dalmaticus minor E. Simon 1908.

Araneus dalmaticus minor E. Simon, Zool. Jahr., XXVI, 1908, p. 430.

Localities. — Siwa, 20-28.V, 1 ♂, 4 ♀♀, 2 juv. (n. 749-755), 1 ♂, 1 ♀ subad., 1 juv. (from tube n. 760-765), 1 ♂ subad., 1 juv. (from tube n. 776-778), 1 ♂ (n. 775); 20-30.VI, 2 ♂♂, 3 ♀♀; VII, 1 ♀ (from tube n. 178-179); 9.VII, 1 ♀ (from tube n. 189-190); 15.VII, 1 ♂; 18.VII, 1 ♀ (n. 203), 1 ♀ (n. 205); 1.VIII, 1 ♀ (n. 339); 4.VIII, 1 ♀ subad. (n. 345); 7.VIII, 1 ♀, 1 juv. (n. 393-394); 9.VIII, 1 juv. (n. 399); 13.VIII, 1 ♀ (n. 396); 21.VIII, 1 ♂ (n. 494); 30.VIII, 1 ♀ (from tube n. 99-106). Siwa Tarterad, 18.VII, 3 juv. (n. 839-840). Baharein, 17.VI, 2 ♂♂ subad., 1 ♀ subad., 1 juv. (n. 854-857). Ilrhabit Uncorde, 18.VII, 1 ♀ (n. 898). Girba, 12.VIII, 1 juv. (n. 891). Khamissa, 5.VIII, 1 ♀, 6 juv. Pond n. 53, marsh near Khamissa, 6.V, 1 ♂ subad.

Distribution. — Libya : Tripoli (Simon, 1908 a); Giarabub (di Caporiacco, 1928, p. 93). Algerian and Tunisian Sahara (Simon, 1908 a).

Remarks. — As a rule these spiders are very pale in colour, but in most of them the folium is well marked at the hind part of their abdomen.

45. Araneus suspicax (O. P. Cambridge) 1876.

(pl. II, figs. 10-11).

Epeira apoclisa Audouin, Descr. Eg., Hist. Nat., I, 1825, p. 128, pl. 3, figs. 1-2.
Epeira apoclisa Audouin, Descr. Eg., Hist. Nat., 2e éd., XXII, 1827, p. 339.
Epeira suspicax O. P. Cambridge, Proc. Zool. Soc., 1876, p. 577.
Araneus suspicax E. Simon, Arachn. Fr., VI (3), 1929, p. 686.

Localities. — Siwa, 20-28.V, 1 ♂ (from tube n. 736-737); 20-30.VI, 1 ♂, 1 ♂ subad., 5 ♀♀, 2 ♀♀ subad., 3 juv.; 11.VII, 1 ♂, 1 ♀, 1 juv. (n. 810-812). Khamissa, Siwa depression, 4.V, 1 ♂ subad., 1 ♀ subad. (n. 131-132), 1 juv. (from tube n. 133-134); 22.VI, 1 ♂; 1 ♀ (n. 912), 3 ♀♀, 2 juv. (n. 934-938), 1 ♀ n. 939). Near Khamissa, 7.IX, 11 ♀♀ (n. 966-976). Gara, 4.VII, 1 ♂ (n. 878). Ilrhabit Uncorde, 18.VII, 1 ♂, 2 ♀♀, 2 juv. (n. 899-903). Pond. n. 19, Ilrhabit Uncorde, 29.VI, 1 ♂, 1 ♀ subad., 1 juv. Shiata, 2.VIII, 2 ♂♂ subad., 1 ♀ (n. 1020-1022), 2 ♂♂ (n. 1047-1048). Maragi, 14.VIII, 1 ♂, 4 ♀♀ (n. 989-993). Koreishid, 29.VIII, 6 ♀♀, 2 juv. (n. 981-988).

Distribution. — South of France (Simon, 1929, p. 759). Algeria : Southern oases (Simon, 1908 a, p. 430; 1929, p. 759). Libya : Aïn Zara, Benghazi, Derna (Simon, 1908 a, p. 430); Gát (di Caporiacco, 1936 b, p. 87); Cufra, El Giof, El Teilib (di Caporiacco, 1933, p. 325). Egypt : Alexandria (Cambridge, 1876); Bir Hooker (Simon, 1899 a, p. 244; Strand, 1908 b, p. 379).

Remarks. — This spider rather varies in colour; in a few specimens the folium is scarcely conspicuous except at the very hind part of the abdomen where only its outline is to be seen. The sternum of one specimen is not paler in the middle.

DIONYCHAE

Fam. SPARASSIDAE

46. Eusparassus dufouri oraniensis (Lucas) 1846.

(pl. II, fig. 12)

Olios oraniensis Lucas, Expl. Alg., Arachn., 1846, p. 201, pl. XI, fig. 9.
Sparassus currax Blackwall, Ann. Nat. Hist., (3) I, 1858.
Ocypete fritschi C. Koch, Ber. Senckenb. Ges., 1872-1873, p. 114.

Sparassus oraniensis E. Simon, Ann. Soc. Entom. Fr., (5) IV, 1874, p. 255.
Eusparassus oraniensis Strand, Arch. Math. Naturw., Kristania, XXIX, 1908, p. 23.
Eusparassus argelasius oraniensis E. Simon, Mém. Soc. Esp. Hist. Nat., VI, 1909, p. 31.

Localities. — Siwa, 29.IV-3.V, 1 ♂ subad., 1 ♀ (n. 226-227); 20-30.V, 2 juv. (n. 103-104), 2 ♀♀ subad, (n. 105-106), 1 juv. (n. 107), 1 juv. (from tube n. 114-133); 22.VII, 1 ♀ (n. 176), 1.VIII, 1 juv. (n. 336); 7.VIII, 1 juv. (n. 383); 6-19.VIII, 1 juv. (n. 448); 30.VIII, 1 ♀ (n. 560), 1 juv. (n. 561), 2 juv. (n. 562-563); 6.IX, 4 juv. (n. 646); 8.IX, 1 juv. (n. 658); 10.IX, 3 juv. (n. 699-701). Gara, 4.VII, 1 juv. (n. 877).

Distribution. — Portugal : Lega de Palmeira (Bacelar, 1927, p. 133, *E. oraniensis*). Morocco : Casablanca, Mtuga Higla Plateau (C. Koch, 1873); near Tangiers, Al Kassar (Simon, 1874). Algeria : chiefly western part (Simon, 1909 a); Djebel Santon, Santa Cruz, near Oran (Lucas, 1846). Tunis (Simon, 1909 a). Abyssinia : Mane River (Strand, 1908 a).

Remarks. — *Eusparassus dufouri* E. Simon [= *argelasius* (Latr.) auct.] is a very variable species of which a number of subspecies have been described; the proportion in the eyes does not give a good distinctive character; the pigmentation of the legs is variable also. I think the specimens from Siwa have been correctly identified; it is however rather a surprising fact that a species of which such a number have been found by the Armstrong College Expedition, is not yet known to belong to the Egyptian fauna; its epigyne is very near that of the following species from which it may be distinguished by the patellae : these are in fact spineless in *E. dufouri oraniensis* when as a rule they bear a posterior spine in *E. walckenaeri;* the male of the latter has in addition an anterior spine on the patellae.

When I described *E. dufouri kabylianus* (*Proc. Zool. Soc.*, 1936, p. 1050), I laid too much stress on ocular proportions; the epigyne of this spider (pl. II, fig. 13) is more different from the one of *E. dufouri* than the latter from that of *walckenaeri*, so I no longer think that it is a subspecies of *dufouri*. It is merely a synonym of *Eusparassus letourneuxi* (E. Simon).

Specimens from tube n. 699-701 were found in houses, a rather unusual place of capture for this species, although the following one was met with on board a boat by Cambridge.

47. Eusparassus walckenaeri (Audouin) 1825.

(pl. II, figs. 14-16)

Philodromus walckenaërii Audouin, Descr. Eg., Hist. Nat., I, 1825, p. 159, pl. VI, fig. 1.
Philodromus linnaei Audouin, ibid., 1825, p. 160, pl. VI, fig. 2.
Sparassus cambridgei E. Simon, Ann. Soc. Entom. Fr., (5) IV, 1874, p. 257.

Sparassus extensipes Karsch, Zeitschr. Ges. Naturwiss., LIII, 1880, p. 387.
Sparassus walckenaerius E. Simon, Actes Soc. Linn. Bordeaux, XXXIV, 1880, p. 292.
Sparassus linnaei Kulczynski, Bull. Acad. Cracovie, 1901, p. 43.
Eusparassus walckenaerius Strand, Arch. Math. Naturw., Kristiana, XXIX, 1908, p. 24.

Locality. — Siwa, 19.IV, 3 ♂♂ subad., 2 ♀♀, 1 ♀ subad., 3 juv. (n. 150-156); 24.IV, 1 ♀ (n. 158); 29.IV, 1 ♂ (n. 6); 20-30.V, 2 ♂♂ (n. 90-93), 3 ♀♀ (n. 94-96), 2 ♂♂ (n. 97-98); VIII, 1 ♀ (n. 157); 22.VIII, 1 ♀ (n. 177); 27.VIII, 1 juv. (n. 516); 6.IX, 1 juv. (n. 632); 8.IX, 4 juv. (n. 654-657).

Distribution. — Syria (Simon, 1874) : Latakieh (Simon, 1880 c); Damascus, Broumana on Lebanon (Gadeau de Kerville, 1926, p. 68). Palestine (Cambridge, 1872, p. 311) : Jericho (*ibid.*, p. 312, *Sparassus linnaei*). Mesopotamia : Mossoul (Simon, 1880 c). Yemen : Tes (Simon, 1882, p. 224; 1890 a, p. 111); Hodeida, Djebel Milhan (Simon, 1890 a, p. 111). Aden (Simon, 1880 c; 1882, p. 224; 1890 a, p. 111); Sceikh Othman (Simon, 1882, p. 224; 1890 a, p. 111). Erythraea : Massowah (Pavesi, 1883, p. 95, *S. argelasii;* Kulczynski, 1901, p. 3); Assab, Moncullo, Saati (Kulczynski, 1901, p. 3); Assaorta, Elghena (Reimoser, 1937, p. 21). French Somaliland : Daouenle region (Berland, 1922, p. 62); Obock (Simon, 1887, p. 452). Abyssinia : Agaos (Simon, 1880 c; Pavesi, 1883, p. 100), Ouebbi, Gierin (Pavesi, 1895, p. 513). Italian Somaliland : Dubuluh (Pavesi, 1897, p. 170), from Obbia to Alluba, from Bardera to Culmiso (Pavesi, 1895, p. 513). Seychelles Islands (Simon, 1893 a, p. 208; 1897 a, p. 380). Tanganyka : Meru (Simon, 1890 b, p. 128). Anglo-Egyptian Soudan : Khor Attar (Simon, 1906, p. 1168); Omdourman (Simon, 1907 a, p. 7); Khartum (Pavesi, 1895, p. 513; Simon, 1907 a, p. 7); Squakin (Pavesi, 1883, p. 95, *S. argelasii*). Egypt : Cairo (Karsch, 1880; Simon, 1907 a, p. 7); lower Egypt (Cambridge, 1872, p. 311; 1876, p. 587; Pavesi, 1895, p. 513); Bir Hooker (Simon, 1899 a, p. 244; Strand, 1908 d). Libya : Djebel Tegrinna in Djebel Gharian (Simon, 1908 a, p. 433). Tunis : Tunis (Pavesi, 1884, p. 453; Strand, 1908 d); Nefta (Simon, 1880 c); Zarzis (Simon, 1885, p. 12); Gerid, Kairouan, Tozzeur, Tameghza (Pavesi, 1880, p. 364). Eastern Algeria (Simon, 1882, p. 224). South Africa : Cape (Simon, 1890 b, p. 128).

Remarks. — Kulczynski (1901, p. 44) says the female of his *Sparassus linnaei* has spineless patellae, which is not in agreement with my observations with regard to *Eusparassus dufouri oraniensis*. The genus is a very difficult one. Kulczynski himself is doubtful whether the male and female which he describes under *Sparassus linnaei* really belong to the same species; and in any case he does not describe the spinal armature of the male patellae.

47. Olios impediens spec. nov.

(pl. II, fig. 17)

Localities. — Siwa, 20-28.V, 1 ♂ subad., 1 ♀, 3 juv. (n. 722-726); 4.IX. 1 juv. (from tube n. 30-32). Ilrhabit Uncorde, pond n. 19 and drains, 18.V, 1 ♀ subad.

Description. — ♀ 11 mill. long. Cephalothorax yellow, slightly pigmented with brown on both sides of the cephalic part. Anterior eyes equidistant, the medians larger than the laterals; posterior eyes nearly equidistant, disposed in a slightly procurved row; median eyes disposed in a trapeze wider behind than in front and slightly wider than long. Sternum yellow; falces orange-coloured, light red-brown in the apical half, their lower margin bearing four teeth decreasing in size from the second to the fourth one. Legs yellow, reddish-brown at their ends, tarsi wholly reddish brown; first patellae spineless, tibiae and metatarsi armed with two pairs of lower, two lateral anterior and two lateral posterior spines. Abdomen yellow with, on its fore half, a few brownish, little spots limiting a lanceolated stripe which tapers off to a point behind; a few other brownish, little spots are irregularly scattered on the back.

Male unknown.

Remarks. — In the form of its epigyne this spider differs greatly from the other species of *Olios* that I know. The only adult specimen lacks the ordinary bristles on the lobe of the lower margin of its falces but there can be no doubt that these bristles have been rubbed off, as their points of insertion are obvious and they are present in every young specimen.

49. Cerbalus concolor spec. nov.

(pl. III, figs. 1-3)

Locality. — Siwa, near Zeitoun, sand dunes, 30.VIII, 1 ♂ (n. 1070).

Description. — ♂ length to 10 mill. Cephalothorax yellow, clothed with short, white hairs. Eyes circled with black; anterior eyes disposed in a slightly procurved row by their centres, the medians twice as large as the laterals, separated by half their diameter from one another, almost adjoining the lateral ones; posterior eyes disposed in a slightly recurved row, the medians a little more separated from each other than from the lateral ones; median eyes disposed in a trapeze wider in front than behind, wider in front than long, longer than wide behind. Clypeus narrow. Sternum yellow with the lower margin armed with three teeth, the median one being the biggest. Legs yellow, II, I, IV, III; first patellae spineless, tibiae armed with two lower, two lateral anterior and two lateral posterior, spines, metatarsi armed in the same manner and in addition one upper spine; the lower spines are basal and median, the lateral spines are level with the hind lower ones and before the median lower ones; the upper spine of the metatarsi is nearly basal. Palp yellow, its tarsus light red-brown in places, furnished with white hairs, very long on the inner side of the tibia. Abdomen yellow, densely clothed with white hairs.

Female unknown.

Remarks. — I think this spider really belongs to the genus *Cerbalus* although the ocular formula is rather abnormal.

Fam. THOMISIDAE

50. Tmarus piochardi (E. Simon) 1866 (?).

Thomisus piochardi E. Simon, Ann. Soc. Entom. Fr., (4)VI, 1866, p. 284, pl. IV, figs.10-12.
Tmarus piochardi E. Simon, Arachn. Fr., II, 1875, p. 261, pl. VIII, fig. 1.
?*Monaeses leo* E. Caffi, Ragni Calabr. St., 1895, p. 25.
Tmarus piochardi E. Simon, Arachn. Fr., VI (4), 1932, p. 783, figs. 1136-1138.

Localities. — Siwa, 10.VII, 1 ♀ subad., 1 juv. (n. 270-271). Khamissa, 5.VIII, 1 ♂ subad.

Both are very doubtful identifications.

Distribution. — Portugal : Sao Martinho de Anta (Bacelar, 1927, p. 132); Coimbra, Guarda (Bacelar, 1928, p. 178). Spain : Grenada, Sierra Nevada (Simon, 1866); Bajadoz, Calella, Madrid, Salamanca (Galiano, 1910, p. 378). France : Corsica, Provence (Simon, 1875; 1932, p. 867); Cavalaire (Denis, 1933 b, p. 97); Porquerolles Island (Becker, 1880, p. CXXXIX). Italy : Calabria (Caffi, 1895); Sicily (Simon, 1932, p. 867). Yugo-Slavia (quoted by Bristowe, 1934, p. 752, which is the original reference I do not know). Greece : Athens (Simon, 1884 a, p. 324). Crete (after Bristowe, 1934). Dodecanese : Aghios Isidoros (di Caporiacco, 1929, p. 233). Rhodes (*ibid.*). Syria (Simon, 1875). Aden (Simon, 1890 a, p. 107). India (after Bristowe, 1934) Italian Somaliland : from Salole to Girma, Hanacio (Pavesi, 1897, p. 173). Tunis : Aïn Draham, Gabes, Gafsa (Simon, 1885, p. 17). Algeria (Simon, 1932, p. 867).

51. Thomisus onustus Walckenaer 1805.

Thomisus onustus Walckenaer, Hist. Nat. Ar., 1805, fasc. 3, p. 32.
Thomisus abbreviatus Walckenaer, Faune Fr. Aran., 1825, p. 76.
Thomisus onustus Walckenaer, ibid., 1825, p. 77, pl. VI, fig. 5.
Thomisus diadema Hahn, Arachn., I, 1831, p. 49, pl. XIII, fig. 37.
Thomisus abbreviatus Walckenaer, Apt., I, 1837, p. 516.
Thomisus onustus Walckenaer, ibid., 1837, p. 517.
Thomisus nobilis C. L. Koch, Ueber Arachn. Syst., I, 1837, p. 24.

Thomisus diadema C. L. Koch, Arachn., IV, 1838, p. 51, figs. 281-282.
Thomisus sanguinolentus Walckenaer, Apt., II, 1842, p. 469.
Thomisus abbreviatus Blackwall, Sp. Gr. Br. Tr., I, 1861, p. 90, pl. IV, fig. 54.
Thomisus auriculatus Prach, Verh. Zool. Bot. Ges. Wien, XVI, 1866, p. 605.
Thomisus onustus E. Simon, Arachn. Fr., II, 1875, p. 251.
Thomisus onustus O. P. Cambridge, Sp. Dorset, II, 1881, p. 288.
Thomisus onustus Becker, Arachn. Belg., I, 1832, p. 216, pl. XXII, fig. 3.
Thomisus albus Bösenberg, Sp. Deutschl., 1902, p. 339, pl. XXXII, fig. 503.
Thomisus albus de Lessert, Cat. Ar. Suisse, 1910, p. 351.
Thomisus onustus E. Simon, Bull. Soc. Entom. Fr., 1918, p. 51.
Thomisus albus Roewer, Tierw. Mitteleur., Aran., 1929, p. 19, figs. 192-193.
Thomisus onustus E. Simon, Arachn. Fr., VI (4), 1932, p. 788, figs. 1149-1150.

Localities. — Siwa, 18.IV, 1 juv, 20-28.V, 2 ♂♂ (n. 730-732) ; 20-30.VI, 1 juv. ; 2.VIII, 1 juv. (n. 299) ; 21.VII, 1 juv. (n. 281), 1 ♂, 1 juv. (n. 293-294) ; 13.VIII, 2 juv. (from tube n. 420) ; 21.VIII, 1 juv. (n. 495), 1 juv. (n. 496) ; 30.VIII, 1 juv. (from tube n. 97-98). El Arig, 7-8.VI, 1 ♂ (n. 865).

Distribution. — A very widespread spider in Europe except in the north, found also in the Mediterranean region, Central and Eastern Asia ; there is but one record from the Atlantic Islands (Cape Verde Islands, Berland, 1936, p. 77).

52. Thomisus hilarulus E. Simon 1875.

Thomisus hilarulus E. Simon, Arachn. Fr., II, 1875, p. 252.
Thomisus hilarulus E. Simon, Zool. Jahr., XXVI, 1908, p. 432.
Thomisus hilarulus E. Simon, Arachn. Fr. VI (4), 1932, p. 788, fig. 1151.

Localities. — Siwa, 29.IV-3.V, 1 ♀ subad. (n. 237) ; 20-28.V, 7 ♀♀, 4 juv. (n. 714-721), 1 ♂ (from tube n. 730-732) ; 15.VII, 2 ♂♂ ; 26.VII, 2 ♂♂ ; 13.VIII, 1 juv. (from tube n. 420) ; 14.VIII, 1 ♂ (n. 425) ; 16-19.VIII, 2 ♂♂ (n. 451-452), 2 juv. (n. 490-491) ; 21.VIII, 1 ♂ (n. 497) ; 30.VIII, 2 ♂♂ (from tube n. 77-84), 1 juv. (n. 85), 1 juv. (from tube n. 97-98) ; 31.VIII, 1 ♂, 2 ♂♂ subad., 1 juv. (n. 55-56) ; 3.IX, 1 juv. (n. 588) ; without any date, 1 ♀ (n. 1072). Siwa depression, on *Acacia* trees, 22.VIII, 2 ♂♂ (n. 510-511). Maragi, 14.VIII, 1 ♀ (n. 994). Zegawa, 17.VII, 1 ♂.

Distribution. — France : Nice (Simon, 1875) ; Var, Corsica (Simon, 1932, p. 868). Italy : Calabria (quoted by Reimaser, 1919, p. 118), Sicily (Simon, 1875, 1908 a). Anatolia (di Caporiacco 1935, p. 288). Syria : Damascus Oasis (Gadeau de Kerville, 1926, p. 67). Egypt (Simon, 1908 a). Libya : Giarabub (di Caporiacco, 1928, p. 93) ; Agedabia, Gialo, Hattia di Gur Atta, Cufra, Gebel Hanaish, el

Giof, Buma, el Talab, el Haneniri (di Caporiacco, 1933, p. 325); Tripoli (Simon, 1908 a); Derna (Simon, 1908 a; di Caporiacco, 1934, p. 17); Merg', Tolmetta, Tecniz, Zania el-Mechili, Uadi Kuf (di Caporiacco, 1934, p. 17); Uadi Isein, Uadi Tanezzuft (di Caporiacco 1936 b, p. 77). Tunis : Gabes, Gafsa (Simon, 1885, p. 17). Algeria (Simon, 1908 a). Canary Islands (Simon, 1883, p. 286; 1889, p. 301).

53. Thomisus spinifer O. P. Cambridge 1872.

Thomisus spinifer O. P. Cambridge, Proc. Zool. Soc., 1872, p. 308, pl. XIV, fig. 14.
Thomisus citrinellus E. Simon, Arachn. Fr. II, 1875, p. 253.
Thomisus spinifer E. Simon, Ann. Soc. Entom. Fr., (6) V, 1885, p. 360.
Thomisus spinifer Strand, Jahrb. Nassau Ver., LX, 1907, p. 107.
Thomisus spinifer E. Simon, Arachn. Fr., VI (4), 1932, p. 787, fig. 1148.
Thomisus spinifer de Lessert, Rev. Suisse Zool., XLIII, 1936, p. 255, figs. 49 and 51.

Localities. — Siwa, 29.IV-3.V, 1 ♂ (from tube n. 247-256); 20-30.VI, 1 ♀; 7.VIII, 1 ♂ (n. 392); 15.VIII, 3 ♂♂ (n. 438-440); 30.VIII, 6 ♂♂ (n. 77-84). Zeitoun, 2.IX, 1 ♂, 1 ♀ subad.

Distribution. — Spain, in Pyrenees (Simon, 1875). France, in the Mediterranean region (Simon, 1932, p. 868). Syria : near Homs Lake, Beit-Mari on the Lebanon (Gadeau de Kerville, 1926, p. 67). Palestine : plains of the Jordan (Cambridge, 1872). Aden (Simon, 1890 a, p. 106). India : Bombay (Cambridge, 1872). French Somaliland : Djibouti (quoted by Berland, 1922, p. 61). Sokotra : Hadibu Plain (Pocock, 1903, p. 198). Seychelles Islands (Simon, 1897, p. 379). Portuguese Eastern Africa : Charre, Lower Sangadze (de Lessert, 1936). Kenia : Kisumu (Berland, 1922, p. 61). Abyssinia : Mahal-Uonz, from Let-Marefiá, Cialalaká Lake, Giagagué (Pavesi, 1883, p. 57); Daroli (Strand, 1907, p. 107). Anglo-Egyptian Soudan : Khartum (Simon, 1907 a, p. 6). Egypt : Assuan (Simon, 1907 a, p. 6); Bir Hooker (Simon, 1899 a, p. 244); between Cairo and Thebes (Cambridge, 1876, p. 580). Libya : Cufra, el Giof, es Zurgh (di Caporiacco, 1933, p. 325); Haut Haffún, El-Anenát (di Caporiacco, 1936 a, p. 102). Algeria (quoted by de Lessert, 1936). Senegal : Dakar, Saint-Louis (Simon, 1886, p. 360). Portuguese Guinea : Bolama (Simon, 1907 b, p. 315).

Remarks. — These last three species are very near each other, especially the first two. I think however the identifications are correct, save possibly for a few young examples. In some specimens of *Th. hilarulus*, the metatarsi are brown except at their ends.

A young specimen from Gara (4.VII, n. 873) has lost its front legs and cannot be specifically determined.

54. Synaema diana (Audouin) 1825.

Thomisus diana Audouin, Descr. Eg., Hist. Nat., I, 1825, p. 165, pl. VII, figs. 1-2.
Thomisus diana Audouin, Descr. Eg., Hist. Nat., 2^e^ éd., XXII, 1827, p. 399.
Synaema diana de Lessert, Revue Suisse Zool., XXVII, 1919, p. 148, fig. 20, and pl. II, figs. 19 and 23.

Localities. — Siwa, 20-30.VI, 1 juv. Zeitoun, 2.IX, 1 ♂. Girba, 12.VIII, 1 juv. (n. 892).

Distribution. — Aden (Simon, 1882, p. 224). Yemen : Hodeïda (Simon, 1890 a, p. 108). Palestine : plains of the Jordan near Jericho (Cambridge, 1872, p. 306, *Thomisus d.*). Erythraea : Massowah (Reimoser, 1937, p. 22). Abyssinia (Simon, 1897 b, p. 388). Italian Somaliland : Medo-Erelle (Pavesi, 1897, p. 174). Madagascar (Simon, 1895, p. 1033). Portuguese East Africa : Vila Pery (de Lessert, 1936, p. 260). Tanganyka : Kibonoto (de Lessert, 1919, p. 148). Egypt : between Cairo and Thebes (Cambridge, 1876, p. 580, *Diaea d.*) ; Bir-Hooker (Simon, 1899 a, p. 244). Tunis : Kairouan, Djebel Bou Hedma (Simon, 1885, p. 17).

55. Philodromus omer-cooperi spec. nov.

(pl. III, fig. 4)

Locality. — Shiata, 2.VIII, 1 ♂ (n. 1060).

Description. — ♂ 6 mill. long. Cephalothorax pale drab-brown, bordered with a white marginal line ; anterior and posteror-median eyes situated in a whitish area lengthened posteriorly into three fine white lines from the interval between the postero-median eyes and into an irregular line surrounding the cephalic part ; on both sides of the thoracic part, three white zigzaged lines are disposed into a submarginal line ; clypeus whitish with a double brownish spot on both sides in front of the lateral front eyes. Antero-lateral eyes equalling in size 2/3 of the diameter of the antero-median eyes, these ones more separated from each other than by their diameter, less distinct from the lateral ones ; postero-median eyes more separated from each other than from the lateral ones. Legs very pale drab with black points on femora and patellae ; tibiae, metatarsi and tarsi of the two first pairs more reddish, tibia I with two pairs of lower spines, but with no apical ones. Sternum white, maxillae and lip brownish, falces light drab. Abdomen elongated, whitish ; spinnerets blackish.

Female unknown.

Remark. — The tibial apophysis of the palp of this species closely resembles that of *Ph. fallax* Sund., but the bulb is quite different.

56. Philodromus glaucinus E. Simon 1870.

Philodromus glaucinus E. Simon, Ar. Nouv., 1^er Mém., Liège 1870, p. 71.
Philodromus glaucinus E. Simon, Arach. Fr., II, 1875, p. 289.
Philodromus glaucinus E. Simon, Arach. Fr., VI (4), 1932, figs. 1304-1305.

Locality. — Siwa, 11.VII, 2 ♀♀, 1 juv. (n. 822-823). These specimens are badly damaged, one of the females has but two legs.

Distribution. — Spain (Simon, 1870, 1875) : Barcelona (Cuni, 1888, p. 191). France : in the South (Simon, 1932, p. 885), Landes (Simon, 1875), La Gabinière Islet in Hyères Islands (Denis, 1934, p. 155), Corsica (Simon, 1870, 1875). Sicily (Simon, 1870, 1875). Macedonia (Simon, 1932, p. 885). Greece : Athens (Simon, 1884 a, p. 324), Vassilika (quoted by Bristowe, 1934, p. 752). Dodecanese : Rhodes, Aghios Isidoros, Cattabia (di Caporiacco, 1929, p. 233). Syria ? (Simon, 1932, p. 885). Tunis : Mehedia, El-Kef (Simon, 1885, p. 18) ; near Tunis (Pavesi, 1884, p. 473) ; near Aïn-Draham (Gadeau de Kerville, 1908, p. 53). Algeria : Oulad Messelem (Simon, 1899 b, p. 84). Morocco (Simon, 1875).

Remarks. — In 1875, according to a statement by the Rev. O. P. Cambridge, *Ph. medius* described from Palestine and Syria was said by Simon to be a synonym of *Ph. glaucinus;* in Simon's opinion of 1932 (p. 885), both species seem to be regarded as distinct ; the synonymy of *Ph. glaucinus* Simon 1932 is however in contradiction with the foot-note in the same page so that the record of this species from Syria and Egypt is a doubtful one. I think that the specimens from Siwa have been correctly identified.

57. Thanatus fabricii (Audouin) 1825 (?)

(pl. II, fig. 18; pl. III figs. 5-6)

Philodromus fabricii Audouin, Descr. Eg., Hist. Nat., I, 1825, p. 161, pl. VI, fig. 3.
Philodromus fabricii Audouin, ibid., 2^e éd., XXII, 1827, p. 392.

Localities. — Siwa, 29.IV-3.V, 1 ♂ (n. 239) ; 20-28.V, 3 ♀♀, 2 juv (n. 769-774) ; 20-30.VI, 2 juv. (?) ; 16.VII, 1 juv. (?) (n. 107) ; 21.VII, 1 juv. (?) (n. 297) ; 26-28.VII, 1 ♂, 1 juv. (n. 332) ; 1.VIII, 1 ♀ subad. (n. 340) ; 9.VIII, 1 ♀ (n. 398) ; 14.VIII, 2 ♀♀, 1 juv. (from tube n. 419-422) ; 15.VIII, 1 ♀ (n. 427) ; 16-19.VIII, 2 ♂♂ (n. 463), 4 ♀♀ (n. 466-469), 1 ♂ subad., 5 ♀♀, 24 juv. (n. 470-489) ; 18.VIII, 2 juv. (?) (n. 198-199) ; 21.VIII, 1 ♀ (n. 493) ; 31.VIII, 1 ♂, 1 ♂ (?) without his palpes) 1 ♂ subad., 2 ♀♀, 1 ♀ subad., 3 juv. (n. 47-54) ; 30.VIII, 3 ♀♀, 1 ♀ subad., 9 juv. (from tube n. 99-106) ; 3.IX, 1 ♀ (n. 587) ; 4.IX, 2 ♀♀ (n. 30-32), 1 ♂, 2 ♂♂ subad., 16 ♀♀, 1 ♀ subad., 14 juv. ; 8.IX, 1 ♂

subad., 1 ♀ (n. 668-669). Siwa Tarterad, 18.VII, 1 ♀ (n. 835). Gara, 4.VII, 1 ♀ (n. 872).

Distribution. — Egypt (Audouin, 1825). Libya : Derna (di Caporiacco 1934, p. 18).

Remarks. — This is a very doubtful identification as the spider has not been redescribed or figured since Savigny's drawing. Legs of the second and fourth pairs are nearly equal in length and the lanceolate marking on the back of the abdomen as a rule has two prominent points on each side, but I do not think that these spiders belong to *Th. thorelli* (O. P. Cambridge) because there is a very obtuse apophysis at the end of the tibia of the male palp, which is rather conspicuous when the palp is seen from below.

58. Thanatus albini (Audouin) 1825 (?)

(pl. IV, figs. 2-3)

Philodromus albini Audouin, Descr. Eg., Hist. Nat., I, 1825, p. 161, pl. 6, fig. 4.
Philodromus albini Audouin, Descr. Eg., Hist. Nat., 2e éd., XXII, 1827, p. 392.

Locality. — Baharein, East Lake shore, 13.VI, 4 ♂♂, 4 ♀♀, 12 juv. (M. Cameron).

Distribution. — Syria : Damascus (Cambridge, 1872, p. 310, *Philodromus a.*). Palestine : plains of the Jordan (*ibid.*). Egypt (Audouin, 1825 ; Cambridge, 1876, p. 591) : ? Cairo (Simon, 1907 a, p. 7).

Remark. — An identification as doubtful as the preceding one.

59. Thanatus adjacens (O. P. Cambridge) 1876.

Philodromus adjacens O. P. Cambridge, Proc. Zool. Soc., 1876, p. 592, pl. LIX, fig. 11.

Locality. — Siwa, 20-28.V, 1 ♀, 5 juv. (n. 802-807) ; 16.VII, 1 ♀ (from tube n. 108-109) ; 21.VII, 1 ♀ (n. 298) ; 15.VIII, 3 ♀♀, 5 juv. (n. 441-444).

Distribution. — Palestine : Jerusalem, Jericho (Cambridge, 1872, p. 310, *Philodromus fabricii*). Tunis : Oued Leben, Gabes (Simon, 1885, p. 18). Libya : Agedabia, Gialo (di Caporiacco, 1933, p. 332). Egypt : near Alexandria (Cambridge, 1876). Italian Somaliland (Pavesi, 1895, p. 43).

60. Tibellus vossioni E. Simon 1884.

Tibellus vossioni E. Simon, Bull. Soc. Zool. Fr., IX, 1884, p. 10, pl. I, fig. 4.
Tibellus vossioni L. Berland, Araignées, in : Voyage de Rotschild..., 1922, pl. A_2, fig. 5.

Locality. — El Arig, 7-8.VI, 1 ♀ (n. 859).

Distribution. — Greece : Delos (Bristowe, 1934, p. 753). Asia Minor (after Bristowe, 1934, p. 753). Anglo-Egyptian Soudan : Khartoum

(Simon, 1884 b) ; ? Khor Attar (Simon, 1906, p. 1167). Abyssinia : between Errer es Saghir and Milmil (Pavesi, 1897, p. 171) ; Dagota Valley (Simon, 1904, p. 443). Kenia : Marsabik Mount (Berland, 1922, p. 61). Tanganyka (de Lessert, 1919, p. 61, var. *minor*). Belgian Congo : Faraje (de Lessert, 1928, p. 329, var. *armatus*). Angola : Hunene River (Lawrence, 1927, p. 40). Algeria (after Bristowe, 1934).

Remarks. — The epigyne of the specimen from El Arig much resembles that of *T. macellus* E. Simon, but there are no spines on the fourth patellae and the abdomen lacks the two minute black points at its hind part. The epigyne of *T. vossioni*, as drawn by de Lessert (1919, pl. II, fig. 11, and 1928, p. 330, fig. 17), is rather like the preceding one. I have been however quite unable to detect on the Egyptian example any apical spine on the only first tibia present which is armed with three pairs of lower spines and three lateral ones ; on the metatarsus spines are disposed as in *T. vossioni*. The abdominal pattern is far less marked than in Berland's figure, the longitudinal stripes are formed by minute spots very near one another, the lateral ones are somewhat paler, there are no ramifications in the space between the stripes, but a series of very minute, scarcely conspicuous, very widely spaced, black points.

Fam. DRASSIDAE

61. Drassodes spec.

Locality. — Siwa, 10.IX, 1 juv. (n. 694).

62. Zelotes simplex J. Denis 1936 (?).

Zelotes simplex J. Denis, Proc. Zool. Soc., 1936, p. 1036, pl. I, fig. 3.

Locality. — Siwa, 4.IX, 3 ♀.

Distribution. — Algeria : Zouagha Forest (Denis, 1936).

Remarks. — These females are 5 mill. long, they are darker in colour than my Algerian examples, with the cephalothorax and the sternum red-brown and legs brown ; tarsi are wholly paler, or paler only at their ends. Subcutaneous spots at the hind part of the epigyne are smaller and not adjoining one another. Notwithstanding these differences I think the spiders belonging to the same species or at least to species very near each other.

A number of young specimens belonging to the genus *Zelotes* have been collected at Siwa : 27.VII, 2 ♀♀ subad. (n. 330-331) ; 7.VIII, 2 ♀♀ subad, (n. 384-385) ; 24.VIII, 1 ♂ subad., 1 ♀ subad. (n. 515-516) ; 31.VIII, 2 ♂♂ subad., 1 ♀ subad. (n. 37-39) ; 3.IX, 3 ♂♂ subad., 1 juv. (n. 572-575), 1 juv. (n. 576) ; 4.IX, 1 juv. (from tube n. 35-36) ; 8.IX, 1 juv. ; 10.IX, 1 ♀ subad. (n. 690), 1 juv. None of these spiders, possibly belonging to several species, is adult and it is by no means possible to class them accurately. This would not even be possible with a similar lot of specimens collected in a country much better known as far as spiders are concerned.

There is besides a young Drassid from Siwa (5.IX), which cannot be assigned to a genus.

63. Zelotes razoumowskyi (Pavesi) 1873 (?).

(pl. III, fig. 7)

Drassus razoumowskyi Pavesi, Ann. Mus. Genova, IV, 1873, p. 123.
Metanophora rustica L. Koch, Zeitschr. Ferdin. Tirol, 1873, p. 309.
Drassus razoumowskyi Pavesi, Atti Soc. Ital. Sc Nat., XVIII, 1875, p. 272.
Drassus cerdo Thorell, Tidjschr. Entom., 1875, p. 95.
Prosthesima larifuga E. Simon, Arachn. Fr., IV, 1878, p. 90.
Prosthesima rustica E. Simon, ibid., 1878, p. 93.
Prosthesima rustica Bertkau, Verh. ver. Rheinl., XXXVII, 1886, pl. VI, fig. 3.
Prosthesima rustica O. P. Cambridge, Proc. Dorset F. Cl., V, 1889, pl. A, fig. 1.
Prosthesima rustica Chyzer et Kulczynski, Aran. Hung., II (2), 1897, p. 195, pl. VIII, fig.4.
Prosthesima rustica Bösenberg, Spinn. Deutschl., 1903, p. 313, pl. 29, fig. 462.
Zelotes razoumowskyi E. Simon, Arachn. Fr., VI (1), 1914, p. 156 and 166, figs. 294 and 341.
Zelotes razoumowskyi Roewer, Tierw. Mitteleur., Aran., 1929, pp. 14-15, pl. I, fig. 130, and pl. II, fig. 113.
Zelotes rusticus Reimoser, Tierw. Deutschl., Spinnent, XXXIII, 1937, p. 25, fig. 60, and p. 28, fig. 74.

Locality. — Siwa, 20-30.V, 1 ♀ (from tube n. 134-138).

Distribution. — A very widespread species inabiting a great part of Europe and North Africa, reaching Eastern Asia.

Remarks. — I think that this female really belongs to the species called *Zelotes rusticus* or *razoumowskyi* which I know only from descriptions; although I was not able to see scopulae (at least thick scopulae) on the first metatarsi, the colour, a rather unusual one in the genus *Zelotes*, and the spines on the first legs, agree well with *Z. razoumowskyi*. In the first part of the sixth volume of Simon's « Arachnides de France » the figures are not very accurate and this is especially true for the females of *Zelotes*. The epigyne of the spider from Siwa differs from Simon's drawing for *Z. razoumowskyi*, but closely resembles that of Chyzer and Kulczynski [1891]. In any case I consider it preferable to give a description of this specimen :

♀ 8 mill. long. — Cephalothorax bright red-brown. Eyes disposed in two slightly procurved rows. Diameter of the antero-lateral eyes equalling 1 1/4 the diameter of the antero-median ones; distance between the antero-median eyes equal to 1/3 of their diameter; distance between antero-median and antero-lateral eyes equal to 1/9 of the diameter of the antero-median ones. Postero-median eyes oval, converging backwards; distance between postero-median eyes equalling 2/3 of the distance between postero-median and postero-lateral eyes. Lateral eyes of both rows about equal in size. Sternum bright red-brown, darker at the margin, lip red-brown, longer than wide by two-thirds of its width, reaching the apical third of the maxillae which are red-brown with their apex white. Falces red-brown with a few black, long hairs, a little projecting; their anterior margin armed with six dark brown teeth, the five first ones adjoining each other, increasing in size from the first one which is very minute to the fifth one, the sixth more removed and medium-sized; their posterior margin provided with three light red-brown teeth which are not disposed in a straight line, the median one being nearest the furrow. Legs light, red-brown, those of the first pair being darker, chiefly on their femora and metatarsi; femora I and II armed with two long, slender spines, a dorsal, nearly basal and an anterior, nearly apical ones; tibiae I and II, metatarsus I without any spine; metatarsus II armed with a pair of basal and an anterior, subapical, lower spines; patella I very long, more than two-thirds of the tibia in length; patella III provided with a posterior spine. Abdomen light grey; spinnerets light drab, the lower ones more than twice as long as wide, separated by their diameter, provided with 2-4 spigots; epigyne red-brown with a dark brown, pear-shaped little plate.

64. Zelotes (?) intricatus spec. nov.

(pl. IV. fig. 4)

Locality. — Pond n. 53, marsh at Khamissa, 6.V, 1 ♀.

Description. — ♀ 3.5 mill. long. Cephalothorax pale reddish-brown, with a black marginal line. Antero-median eyes separated from each other by about their diameter, nearly contiguous to the lateral ones which are larger. Posterior eyes equidistant, disposed in a streight line by their tops, a little wider than the front one, the medians oval converging backwards, larger than the laterals. Sternum pale red-drab with a red-brown marginal line; lip red-drab, a little darker than the maxillae. Falces red-drab without any tooth on their posterior margin. Front legs brownish with darker femora and tibiae; hind legs orange-yellow; palp reddish-drab. Front metatarsi without any scopula. Tibiae I and II without any spine, metatarsus I with one pair of sub-basal spines, metatarsus II with 2-2 spines. Tarsal claws armed with 4 or 5 basal teeth. Abdomen rather light grey, paler underneath with two darker parallel lines.

Male unknown.

Remark. — I am not sure at all that this spider really belongs to the genus *Zelotes*, the comb on hind metatarsi is not well-marked and I doubt whether it really exists.

65. Poecilochroa lesserti spec. nov.

(pl. III, figs. 8-10)

Localities. — Siwa, 18.IV, 1 ♀, a very pale example. Khamissa, Siwa depression, 4.V, 1 ♂ (from tube n. 133-134). Shiata, 2.VIII, 1 ♀ (type, n. 1049).

Description. — ♀ 8 mill. long. Cephalothorax red-brown, scarcely paler on the cephalic part and on very irregular, indefinite, submarginal spots. Antero-median eyes not quite separated from one another by their diameter, nearly contiguous to the lateral ones which are smaller. Posterior eyes disposed in a nearly straight row, almost equal in size, but the median ones have a flat part in their outer front half; distance between antero-median eyes equal to their diameter; distance between antero-median and antero-lateral eyes equal to half the diameter of the median. Distance between antero-median and postero-median eyes not quite equal to 1.5 diameter of the anterior ones; median eyes disposed in a trapeze wider in front than behind, longer than wide in front. Sternum light red-brown studded with long, scattered, black hairs; maxillae red-brown, lip darker, falces red-brown. Legs drab, the palp, the metatarsi and tarsi of the first pair being red-brown; metatarsi and tarsi I furnished with a thick, pale scopula on their sides beneath, metatarsi and tarsi II with a thinner one, tibiae I and II povided with one submedian and one apical, inner, lower spines; metatarsi I and II with a pair of basal spines. Abdomen blackish, much paler, drab in places in front and behind, finely greyish hairy; paler underneath with two parallel, longitudinal, blackish lines.

♂ 6 mill. long. Much paler in colour than the female. Cephalothorax reddish-drab. Distance between antero-median eyes not quite equal to half their diameter; antero-median and antero-lateral eyes contiguous; diameter of the antero-lateral eyes equal to half the diameter of the median ones, i.e. comparatively smaller than in the female. Posterior eyes nearly equal in size, equidistant and separated from one another by their radius. Antero-median eyes larger than the separated from postero-median ones; distance between antero-median and postero-median eyes equal to the diameter of the latter; median eyes disposed in a trapeze wider in front than behind, slightly longer than wide in front. Sternum pale drab; maxillae and lip darker. Legs drab, tibiae and metatarsi I and II provided with the same spines as on the corresponding joints in the first pair of the female; tarsus of the palp red-brown for the most part. Abdomen grey, its fore half covered with a reddish-brown, triangular, hardened plate.

Remarks. — This spider is nearly allied to *P. pugnax* (O. P. Cambridge), from Egypt and Cyrenaïca, but the two parts of its tibial apophysis are much thicker, especially the upper one which is not curved and directed forward. From the description of the female of *P. pugnax* by E. Simon (1908 a, p. 423), the females seem to be very near one another.

I have named this spider after Dr. R. de Lessert, the well-known student of African spiders.

66. Pterotricha isiaca Dalmas 1920.

(pl. IV, fig. 5)

Pterotricha isiaca Dalmas, Ann. Soc. Entom. France, LXXXIX, 1920, p. 259, fig. 24.

Locality. — Siwa, 29.IV-3.V, 1 juv. (n. 238); 21.VII, 1 ♂ (n. 295); VIII, 1 ♀ (n. 571); 14.VIII, 1 juv. ? (from tube n. 419-422); 30.VIII, 1 juv. ? (from tube n. 99-106).

Distribution. — Lower Egypt (de Dalmas, 1920 b). Libya ; Uadi Kuf, in Cirenaica ? (di Caporiacco, 1934, p. 11).

Remarks. — The only female is very badly damaged with all its legs wanting; it is very small in size, being but 5 mill. long; the whole cephalothorax is yellow with the exception of a black, truncated, marginal line; even this is wanting in No. 238.

The male of this species was not known hitherto; the one from Siwa is 8 mill. long, it is therefore larger than the female, which may be explained by the fact that very few specimens are known; besides No. 238, although not adult, is 8.5 mill. long. The cephalothorax is entirely yellow, the abdomen greyish, but shrivelled. The anterior eyes are equal in size, an abnormal feature in the group; distance between antero-median eyes a little less than half their diameter; antero-median and antero-lateral eyes nearly contiguous; the clypeus is as high as the diameter of the anterior eyes. This male is very nearly allied to *P. conspersa* (O. P. Cambridge), from Syria and Egypt, *P. aegyptiaca* Dalmas, from Egypt, and *P. dalmasi* Fage, from the Sudanese Sahara; the apophysis of the tibial joint much resembles that of the latter and, like the three species quoted above, the tarsus of the palp bears an erected brush of hairs behind.

67. Berlandina jovia spec. nov.

(pl. III, fig. 11)

Locality. — Siwa, 20-30.V, 1 ♀ (from tube n. 134-138); 10.IX, 2 juv. ? (n. 695-696).

Description. — ♀ length 7.5 mill. Cephalothorax yellow with its brownish markings not very conspicuous, but its marginal line well marked. Median front eyes separated from one another by their radius, smaller than the lateral ones with which they are almost contiguous. Posterior eyes disposed in a recurved row, the median ones being a little larger than the laterals, but these are more rounded; distance between postero-median eyes equal to their greater diameter, distance between postero-median and postero-lateral eyes equal to half this diameter.

Femora I and II provided with 1.1 upper and 1 outer, lateral, subapical spines; tibiae I armed with 2.1 (outer).2 lower spines; metatarsi I armed with two pairs of lower spines situated in their basal half and one pair of apical spines, between the two sub-basal pairs is one more (inner) spine; tibiae II armed with 1.1 (outer) .2 lower spines; (left) metatarsus II provided with only one pair of sub-basal and one pair of apical lower spines, the intermediate (or submedian) pair being reduced to its inner spine; there seems also to be an inner, submedian, lateral spine; patellae III provided with 1 lateral spine on both sides, patellae IV with only an inner one; tarsi IV provided with a group of 5 subapical spines and a few other ones; palpal tarsi provided with about 15 spines. Claws of the hind pairs provided with 5 or 6 teeth. Abdomen grey, irregularly spotted with yellowish points and showing on its hind half four yellowish transverse spots, the two first ones oval, the two last ones in the form of an accent; underside yellowish with two blackish, poorly marked, parallel, longitudinal lines; lower spinnerets provided with 5 spigots.

Male unknown.

Remarks. — This species is nearly allied to *B. venatrix* (O. P. Cambridge), from Egypt, and especially *B. deserticola* (Dalmas), from Algerian Sahara. It differs from the latter in the presence of spines on its hind tarsi and in the form of its epigyne; the rounded reddish spots of the latter are separated from each other by a little more than their diameter.

68. Minosiella mediocris Dalmas 1920.

Minosiella mediocris Dalmas, Ann. Soc. Entom. France LXXXIX, 1920, p. 311, figs. 113 and 118.

Locality. — Siwa, 12.VIII, 1 ♀ (n. 411).

Distribution. — Egypt : Cairo, Suez (de Dalmas, 1920 b). Tunis : Nefzana, Tozzer (*ibid.*). Algeria : Biskra (*ibid.*).

Remarks. — I can see only 3 spigots on the right lower spinneret, none on the left one the end of which is withdrawn inside.

Fam. CLUBIONIDAE

69. Chiracanthium sp.

(pl. VI, fig. 2)

Locality. — Siwa depression, 22.VIII, 1 ♀ on *Acacia* trees.

Remarks. — This only female is badly damaged and in particular lacks its front legs, which makes a precise identification quite impossible. It is nearly allied to the group of *Ch. punctorium* (Villers).

A few other *Chiracanthium* are too young to be specifically determined; these are from Siwa, 1 juv. (26.IV; from tube n. 1066-1069; from tamarisk); 1 juv. (20-30.V, from tube n. 134-138), 3 juv. (20-28.V, n. 779-781), 7 juv. (21.VII; n. 280-282, and 284-287); from Siwa depression, 1 juv. (22.VIII; n. 512), 1 juv. (no date; n. 1073); from Khamissa, 3 juv. (5.VIII) and from El Arig, 1 juv. (7-8.VI; n. 864).

70. Chiracanthium isiacum O. P. Cambridge 1874.

Chiracanthium isiacum O. P. Cambridge, Proc. Zool. Soc., 1874, p. 407, pl. LII, fig. 31.

Locality. — Siwa, 21.VII, 1 ♂ (n. 279).

Distribution. — Libya : Gat, in Fezzan (di Caporiacco, 1936 b, p. 82); Giarabub (di Caporiacco, 1928, p. 97). Egypt : Cairo (Cambridge, 1874; 1876, p. 553; Simon, 1907 a, p. 7); Bir Hooker (Simon, 1899 a, p. 244). Abyssinia : Let-Marefiá near Dens, pass of Giaguagué (Pavesi, 1883, p. 48; Simon, 1907 supposes that the species here alluded to is really *Ch. aculeatum* E. Simon).

71. Chiracanthium jovium spec. nov.

(pl. IV. fig. 6)

Localities. — Siwa, 29.IV-3.V, 1 ♀, 1 ♀ subad. (n. 235-236), 2 juv. (n. 240-241); 10.VII, 1 ♀ (n. 268); 3.IX, 1 ♀ (n. 585). Khamissa, 5.VIII, 1 ♀.

Description. — ♀ length 8.5 to 9.5 mill. Cephalothorax orange-yellow getting brownish in the ocular area. Falces, lip and maxillae dark red-brown. Sternum and legs pale yellow, tarsi light red-brown at their end. Abdomen greyish with a darker longitudinal stripe in its fore half. Femora I and II armed with II, III and IV with 2.2 spines on their upperside near the apex; tibia I armed with 1.1.1.1 or 2.2 spines on its underside, tibia II without any spine; metatarsus I armed with a pair of subbasal spines and one apical, anterior little spine; metatarsus II with 1.1 or 2.1 spines disposed in the same way.

Male unknown.

Remaks. — Had not the female of *Ch. isiacum* been described already, I should certainly have attributed the spiders here dealt with to this species; but their epigyne does not agree at all with Cambridge's drawing and. unless the latter is a very bad one, the species are distinct. Although the epigyne of *Ch. jovium* varies somewhat in form, it is always bean-shaped with a number of brown subcutaneous ducts and never is the genital orifice in the form of a quadrangular hollow divided by a transverse split.

72. Chiracanthium equestre O. P. Cambridge 1874.

Chiracanthium equestre O. P. Cambridge, Proc. Zool. Soc., 1874, p. 404, pl. LII, fig. 29.

Locality. — Siwa, 20-28.V, 1 ♂ (from tube n. 782-791).

Distribution. — Libya : Gat in Fezzan (di Caporiacco, 1936 b, p. 82). Egypt : Cairo (Cambridge, 1874; 1876, p. 553).

73. Chiracanthium tenue spec. nov.

(pl. IV, figs. 7-8)

Localities. — Siwa, 29.IV-3.V, 1 juv. (from tube n. 244-246); 20-28.V, 1 ♀ (n. 756), 1 ♀ (from tube n. 776-778), 1 juv. (from tube n. 782-791); 4.IX, 1 ♂ (from tube n. 35-36), 1 ♂, 1 ♂ subad. Gara, 4.VIII, 1 ♀ (n 874), Zegawa, 17.VII, 2 ♂♂, 4 ♀♀, 4 ♀♀ subad., 1 juv.

Description. — ♀ 5 mill., ♂ 4 mill. long. Cephalothorax orange-yellow. Falces light red-brown. Lips and maxillae pale red-brown with a darker margin. Sternum yellow. Legs pale yellow. Tibia I armed with one median, lower spine; metatarsus I with a pair of subbasal spines not opposite each other; tibia and metatarsus II apparently without spines, at least in the female, metatarsus II armed as the first one in the male. Abdomen greenish-brown densely spotted with whitish, adorned on its fore upperside with a longitudinal, dark lanceolate stripe not reaching the middle, sometimes unconspicuous; this stripe is parallel in its anterior two-thirds, then it presents a prominent point on each side and tapers off backwards; it is surrounded by an indefinite, whitish border. Spinnerets yellow.

74. Castaneira antinorii (Pavesi) 1880.

(pl. IV, figs. 10-12)

Tylophora antinorii Pavesi, Ann. Mus. Genova, XV, 1880, p. 345.

Localities. — Siwa, 27.VII, 2 ♂♂, 3 ♀♀ (n. 325-329); 7.VIII, 2 ♀♀ (n. 386-387); 31.VIII, 3 ♀♀, 2 juv. (n. 40-44), 1 ♀; 3.IX, 2 ♀♀, 1 juv. (n. 577-579); 7.IX, 3 ♀♀, 1 juv. (n. 650-653); 8.IX, 1 ♀; 10.IX, 1 ♂ (n. 691), 2 juv. (n. 692-693); 1 juv. Taterad Hamid Bakour, 18.VII, 1 ♂, 4 ♀♀, 1 juv.

Distribution. — Tunis : Ludien near Tozzeur (Pavesi, 1880). Anglo-Egyptian Soudan : Gebelein (Simon, 1907 a, p. 8). — Reimoser (1919, p. 185) indicates this spider from Algeria, which is the original quotation I do not know.

Remark. — Several examples bear only one pair of spines under their first tibiae.

Fam. SALTICIDAE

A number of young spiders belonging to this family have been collected by the Armstrong College Expedition; as distinctive characters are occasionally liable to vary with moults and growth, even generic determination is not a matter of certainty with most of them. So as a rule, except when adult specimens were picked up together with young examples, these have remained unnamed. They are : from Siwa, many juv. (20-28.V, from tube n. 739-738), 1 juv. (20-30.V, from tube n. 134-138), 6 juv. (20-30.VI), 2 juv. (10.VII, n. 273-274), 27 juv. (11.VII, from tube n. 813-821), 20 juv. (15.VII), 2 juv. (16.VII, from tube n. 110), 1 juv. (18.VII, from tube n. 191-197), 2 juv. (30-VII, from tube n. 180-185), 5 juv. (4.VIII, n. 346-350), 4 juv. (7.VIII, n. 388-391), 26 juv. from tamarisk (10.VIII, from tube n. 824-833), 3 juv. (12.VIII, n. 412-414), 4 juv. (13.VIII, from tube n. 415-419), 21 juv. (15.VIII, from tube n. 428-437), 1 juv. (21.VIII, n. 492), 1 juv. (31.VIII, from tube n. 45-46), 4 juv. (3.IX, from tube n. 580-584), 4 juv. (4.IX), 1 juv. (16.IX, n. 649); from Siwa Tarterad, 3 juv. (18.VII, from tube n. 841-842); from Khamissa, 2 juv. (22.VI, n. 913-914); from Baharein, 8 juv. (13.VI, East Lake shore (M. Cameron), 1 juv. (17.VI, from tube n. 846-847).

75. Synageles repudiatus (O. P. Cambridge) 1876.

Salticus repudiatus O. P. Cambridge, Proc. Zool. Soc., 1876, p. 625.

Locality. — Baharein, East Lake shore, 13.VI, 2 juv. (M. Cameron).

Distribution. — Egypt : Alexandria (Cambridge, 1876).

76. Cosmophasis cincta spec. nov.

(pl. IV, fig. 9)

Localities. — Siwa, 20-28.V, 1 ♂ n. ad., 2 juv. (n. 757-759); 29.VII, 1 ♀ n. ad. (n. 334). Pond n. 12, Ilrhabit Uncorde, 11.V, 1 ♀.

Description. — ♀ 7 mill. long. Cephalothorax rather pale red-brown on the thoracic part, darker at the margin and behind, darker on the cephalic part; the separation between the two tones is advanced between hind eyes in a little obtuse point in which is a short stria slightly behind the eyes; sides of the cephalothorax clothed with fine white hairs; a few long black hairs, chiefly in front; cephalic and thoracic parts nearly equal in length. Tops of anterior eyes nearly in a straight line, the medians a little less separated from one another than from the lateral ones; eye-lashes very pale drab; no beard; trapeze formed by the median eyes slightly wider behind than in front. Falces red-brown, slightly divergent. Sternum brown, slightly attenuated in front. Coxae and femora brown, other joints orange-yellow, striped with brown on both sides, chiefly in hind legs; palp paler. Metatarsi I and II armed with two pairs of lower spines; tibia I with two posterior lower spines (one subapical and one subbasal ones), two anterior lower spines (one apical one and one in the basal half), and one anterior lateral spine; tibia II with 2.1 (posterior) .2 lower spines and one anterior lateral one; hind legs armed with spines. Abdomen clothed with white and blackish-brown hairs; the white ones form in the front half a wide transverse band with its posterior edge concave posteriorly, and in the hind part two lateral oval spots not meeting together in the median line; underside white with a wide drab band in the middle. Iridescent flashes on the abdomen and legs.

Adult male unknown.

Remarks. — In example No. 334, the oval posterior white spots meet together so that they form a transverse band with its anterior edge almost straight, a little narrower than the anterior band. In all specimens hairs have been more or less rubbed off and the pattern is not perfectly well marked.

I am not quite sure that these spiders really belong to genus *Cosmophasis*.

77. Heliophanus decoratus (L. Koch) 1875.

Heliophanus decoratus L. Koch, Aeg. u. Abyss. Arachn., p. 87, pl. VII, fig. 8.

Localities. — Siwa, 26.IV, 1 ♂, 2 juv., from tamarisk (from tube n. 1066-1069). Aghourmik salt marsh, 18.IV, 1 ♂.

Distribution. — Libya : Benghazi (Simon, 1908 a, p. 436); Et-Tag' in Fezzan (di Caporiacco, 1936 a, p. 105); Porto Bardia (di Caporiacco, 1928, p. 101); Agedabia, Cufra, Buma, El Hannari (di Caporiacco, 1933, p. 333). Egypt : Alexandria (Cambridge, 1876, p. 624); Cairo (L. Koch, 1875). — Reimoser (1919, p. 99) indicates this spider from Soudan and borders of the Red Sea, I do not know which are the original references.

Remarks. — A young example from Siwa (14.VIII, n. 424) cannot be specifically determined. It is the same with a young specimen and a female too badly damaged found at Siwa from tamarisk (10.VIII, n. 834); however the latter does probably belong neither to *H. decoratus* nor to the next species.

78. Heliophanus albescens spec. nov.

(pl. V, figs, 1-3, and pl. VI, fig. 3)

Locality. — Siwa, 9.VIII, 7 ♂♂, 4 ♀♀ (from tube n. 400-410); 10.VIII, 2 ♀♀ from *Tamarix* spec. (from tube n. 824-833).

Description. — ♂ 2.4 to 2.8 mill. long. Cephalic square rough, black; remaining part of the cephalothorax sometimes dark red-brown, but more often very pale reddish drab, reaching the clypeus, rough scarcely darker in the middle and at the margin in front, paler behind, with a very fine, black marginal line, at times scarcely visible; cephalothorax studded with short, fine, white hairs; a little longitudinal stria behind posterior eyes; sternum reddish drab; falces red-brown. Tops of anterior eyes disposed in a straight line, anterior eyes nearly contiguous, diameter of the antero-lateral eyes a little less than half the diameter of the antero-median ones. Legs yellow. Palp light reddish drab with the two femoral apophysis red brown chiefly the outer one; patella yellow, tibia scarcely visible from the outer side, adorned with a little tuft of white hairs at its front, upper end; tarsus brown with white hairs; outer femoral apophysis slightly sinuous when seen from in front, inner one much shorter, stout; tibial apophysis flat, styliform when seen from the side. Abdomen whitish-grey, darker above the spinnerets which are blackish-brown; in the fore half there is a very pale, reddish-drab scutum, rather indistinct in front, reaching the middle of the abdomen.

♀ 2.8 to 3.4 mill. long. Resembles the male in colour, but much paler; abdomen silky white-grey stained with brownish. Cephalothorax clothed with white hairs in front. Sternum yellow. Palp wholly yellow. Spinnerets pale except at their bases.

79. Evophrys fulgens (O. P. Cambridge) 1872.

(pl. V, fig. 4)

Salticus fulgens O. P. Cambridge, Proc. Zool. Soc., 1872, p. 340, pl. XIV, fig. 17.

Localities. — Siwa, 20-28.V, 3 ♂♂, 6 ♀♀, 1 juv. (from tube n. 739-748); 20-30.VI, 2 ♂♂, 2 ♀♀, 1 juv.; 11.VII, 1 ♀ (from tube n. 813-821); 15.VII, 4 ♂♂, 3 ♀♀; 18.VII, 1 ♀ (from tube n. 191-197); 21.VII, 2 ♂♂, 1 ♀, 3 juv. (from tube n. 288-292); 30.VII, 1 ♂, 4 juv. (from tube n. 180-185); 9.VIII, 1 ♀, 2 juv. (from tube n. 400-410); 14.VIII, 1 ♀ (from tube n. 415-418); 30.VIII, 5 ♀♀, 1 juv. (from tube n. 86-92). Siwa Tarterad, 18.VII, 1 ♀ (from tube n. 841-842). Pond n. 53, marsh at Khamissa, 6.V, 1 ♀. Khamissa, 5.VIII, 5 ♀♀, 3 juv. Baharein, East Lake shore, 13.VI, 1 ♂, 1 juv. (M. Cameron); 17.VI, 1 ♀, 1 juv. (n. 846-847).

Distribution. — Syria, Palestine (Cambridge, 1872). Egypt : Alexandria, Cairo, Upper Egypt (Cambridge, 1872; 1876, p. 611).

80. Evophrys granulata spec. nov.

(pl. V, fig. 5)

Locality. — Siwa, 15.VII, 2 ♀♀.

Description. — ♀ 2.8 to 3.4 mill. long. Cephalothorax very rough brown with the cephalic square black and a black marginal line; a little longitudinal stria behind posterior eyes, a few whie hairs on the sides of the cephalothorax; eye-lashes and beard white. Front eyes disposed approximately in a straight line by their tops, equidistant and very near one another, diameter of the antero-lateral eyes equal to half the diameter of the antero-median ones. Falces red-brown. Sternum brownish. Legs yellow; but one spine under tibia II. Abdomen brownish with iridescent flashes, paler underneath.

Male unknown.

81. Evophrys spec.

Locality. — Khamissa, 5.VIII, 1 juv. (from tube n. 959-963). — A species certainly distinct from the preceding ones, perhaps near *E. plebeja* L. Koch.

82. Pseudicius punctatus spec. nov.

(pl. VI, figs. 4-6)

Locality. — Baharein, East Lake shore, 13.VI, 1 ♂, 1 ♀ (M. Cameron).

Description. — ♂ 3.65 mill. long. Cephalothorax red-brown, blackish on the cephalic part, paler on its sides, clothed with short, very pale drab hairs apparently not forming definite bands or spots; on both sides of the cephalic part, under median and hind eyes is a line formed by a few small punctuations; eye-lashes white above the eyes, bright red-drab on the sides of and under the median eyes; beard scarce. Falces pale drab. Sternum pale yellow. Legs pale yellow, the first ones stronger, light brownish. Metatarsus I armed with two pairs of lower spines; tibia I with 2 anterior lower spines, the subapical one more lateral; metatarsus II with 2 spines, tibia II without any spine; tibiae III and IV with one apical lower spine. Palp pale yellow, furnished with white hairs on femur, tibia, patella and the upperside of the tarsus, the latter more coloured, end of tibial apophysis black. Abdomen elongated oval, net-framed white, clothed with bright orange-red hairs forming a rather wide, median stripe and a lateral one on each side, and with white hairs between lateral and median stripes; underside white.

♀ (adult ?) 4.2 mill. long. Cephalothorax rather dark brown, paler on its sides, clothed with very pale drab hairs; eyes widely circled with black;

under median and hind eyes a line of small punctures as in the male; eyelashes and beard white. Falces pale red-brown. Sternum yellow. Legs yellow, the first ones a little more coloured. Metatarsus and tibia I armed as in the male, metatarsus II with 2 spines. Palp almost white. Abdomen with yellowish-white reticulate markings, clothed with white hairs and with bright orange-red other ones forming a pattern as follows : in front, a transverse, roughly triangular stripe, narrower than the following ones; then three more or less regular transverse stripes reaching the sides, the first one is recurved with its edges at the middle part of the abdomen, the two other ones nearer one another, in the posterior half; between first and second stripes is a very sharp Λ connecting them, between second and third ones are two reversed parenthesis) (also connecting them, behind the third one a few concentric circles above the spinnerets.

Remarks. — I am not sure that the epigyne of the female above described is entirely developed.

Reimoser (1919, p. 109) indicates a *Pseudicius rufithorax* E. Simon 1901 from Egypt; in fact p. 623 of Simon's « Histoire Naturelle des Araignées » (1901), this species is mentioned from lower Egypt, but not described, I have not found it described elsewhere and fear it will be a *nomen nudum.* This *P. rufithorax* is possibly the same as *P. punctatus.*

83. Menemerus animatus O. P. Cambridge 1876.

(pl. IV, fig. 16)

Menemerus animatus O. P. Cambridge, Proc. Zool. Soc., 1876, p. 622, pl. LX, fig. 89.

Locality. — Siwa, 29.IV-3.V, 3 ♀♀ (n. 242-243).

Distribution. — Greece : Athens (Simon, 1884 a, p. 308). Asia Minor (Simon, 1884 a, p. 308). Mesopotamia (*sec.* Reimoser, 1919, p. 108). Yemen (*ibid.*). Egypt : Lower Egypt (Simon, 1884 a, p. 308); Upper Egypt, Alexandria (Cambridge, 1876); Bir Hooker (Simon, 1899 a, p. 244). Anglo-Egyptian Soudan : Gondokoro (Simon, 1906, p. 1173). Libya : El Guarscia, Tocra, in Cyrenaica (di Caporiacco, 1934, p. 19). Tunis (*sec.* Bristowe, 1934, p. 771). Algeria : Algiers, Sebkja Sedjoumi (Strand, 1909, p. 18); South Algeria (Simon, 1884 a, p. 308). Senegal (*sec.* Reimoser, 1919, p. 108).

84. Menemerus soldani (Audouin) 1825 (?)

(pl. VI, figs. 7-8)

Salticus soldanii Audouin, Expl. Eg., Hist. Nat., I, 1825, p. 171, pl. VII, figs. 17-18.
Salticus soldanii Audouin, Expl. Eg., Hist. Nat., 2e éd., 1827, p. 181.

Localities. — Siwa, 20-30.VI, 1 ♂. Siwa depression, 22.VIII, 2 ♀♀ (n. 501-502), 1 ♀, 2 juv. on *Acacia* trees.

Distribution. — Egypt : Alexandria (Cambridge, 1876, p. 611, *Attus s.*).

85. Bianor albobimaculatus (Lucas) 1846.

Salticus albobimaculatus Lucas, Expl. Alg., Arachn., 1846, p. 170, pl. 8, fig. 10.
Attus parcus E. Simon, Ann. Soc. Entom. Fr., (4) VIII, 1868, p. 582.
Attus decipiens E. Simon, ibid., 1868, p. 630.
Attus albobimaculatus E. Simon, Ann. Soc. Entom. Fr., (5) I, 1871, p. 223.
Eris albobimaculata E. Simon, Arachn. Fr., III, 1876, p. 198.
Bianor albobimaculatus E. Simon, Arachn. Fr., VI (5), 1937, p. 1218, figs. 1952-1953.

Localities. — Siwa Tarterad, 18.VII, 1 ♂ (n. 837). Pond n. 12, Ilrhabit Uncorde, 18.VII, 2 ♀♀ (n. 896-897).

Distribution. — Spain : Sierra Nevada (Simon, 1868, p. 582, *Attus parcus*); Escorial (Simon, 1868, p. 630, *Attus decipiens*). France : Eastern Pyrenees, la Nouvelle, Gruissan, Lavalduc pond, les Martignes, Saint-Cyr in Var (Simon, 1937, p. 1265); Corsica (Simon, 1871; 1876 b, p. 198; 1937). Sicily : Etna (Simon, 1868, p. 582, *Attus parcus*). Greece : Corfu (Simon, 1878, p. 212, *Eris a.*); Missolonghi (Simon, 1884 a, p. 316, *Eris a.*). Palestine : plains of the Jordan, near Jericho (Cambridge, 1872, p. 322, *Salticus a.*). Egypt : Alexandria, Suez (Simon, 1937); Cairo (Simon, 1907 a, p. 9). Anglo-Egyptian Soudan : Shellal Gebelein, from Ghrab el Eish to Gebel Ahmed Aga, Goz Abu Gomr, along White Nile (*ibid.*); Mongalla (Simon, 1906, p. 1173). Libya : El Giof, Buema, Cufra (di Caporiacco, 1933, p. 335); El Giululád (di Caporiacco, 1936 a, p. 107); Tripoli (Simon, 1908 a, p. 437). Tunis : Gabes (Strand, 1909, p. 19, *Dendryphantes a.*). Algeria : Lake Tonga (Lucas, 1846); birkets (Simon, 1937). Morocco (Simon, 1876 b). Cape Verde Islands ? (Simon, 1937; cf. Berland 1936, p. 80).

86. Phlegra flavipes spec. nov.

(pl. V, figs. 6-8)

Locality. — Siwa, 20-28.V, 1 ♀ (from tube n. 739-748); 28.VIII, 1 ♂, 1 ♀ (from tube n. 539-543); 3.IX, 1 ♀ (from tube n. 580-584).

Description. — ♂ 4.25 mill. long. Cephalic part black; thoracic part twice longer, brown with a black marginal line; cephalic part clothed with short, thick, white hairs becoming drab in front; a wide marginal stripe of white hairs and two other dorsal ones behind dorsal eyes. Eye-lashes drab. Clypeus wholly clothed with dense, very white hairs. Anterior eyes disposed in a recurved row, the bases of the laterals slightly below the upper third part of the median ones; distance between median eyes equal to 1/6 of their diameter; distance between median and lateral eyes equal to 1/4 of the diameter of the former; diameter of lateral eyes not quite half the diameter of the median ones. Falces red-drab with a few white hairs. Sternum yellowish-grey, darker at the margin. Palp yellow with long, very white hairs; a little blackish spot at the end of the tarsus. Legs pale yellow with white hairs; a tuft of black hairs at the lower end of femur I, an inner band of black hairs under patella I; two brown stripes covered with black hairs under tibia I; other legs similar, except hairs at the end of femora III and IV. Patella I with one spine on both sides; tibia I armed with 3.3 lower spines, 1 posterior and 2 anterior inner lateral ones, one more spine on the upperside; tibia II armed with 3 (outer)-1 (inner) lower spines and more numerous lateral ones on both sides. Abdomen reddish-brown on its upperside with a tuft of white hairs in front, a longitudinal median stripe of white hairs in its hind half, clothed with white hairs on both sides; underside yellow; spinnerets long, reddish-brown on their upperside, yellow beneath.

♀ 6.5 mill. long. Cephalic part black, thoracic part rather light red-brown, clothed with more scattered hairs, perhaps rubbed off; marginal stripes not well-marked, separated from the dorsal ones by black hairs. Eye-lashes white, drab on the upperside, beard white, less thick than in the male, clypeus yellow. Anterior eyes disposed in a recurved row, the bases of the laterals at the level of the upper third part of the median ones; eyes equidistant, separated from one another by the eighth part of the diameter of the median ones; diameter of the lateral eyes ot quite half the diameter of the median ones. Falces red-brown. Sternum brownish. Palp yellow furnished with very white hairs. Legs yellow with brown spots, furnished with white and black hairs. Tibia I armed with 3.3 lower spines, without any lateral spine; tibia II armed with 3 (outer)-1 (inner) lower spines and two anterior lateral ones. Abdomen yellow with its upper side stained with brown and clothed with drab hairs; on its brownish upperside, two rather short, parallel, white lines in front followed by a transverse accent; in the hind half are two rounded white spots, one on each side, connected by a very fine transverse line followed by a few little accents decreasing in size to the end; upperside of the spinnerets brown. Epigyne very pale red-brown.

87. Phlegra proxima spec. nov.

(pl. V, fig. 9)

Locality. — Sitra, 14-16.VI, 1 ♀ (from tube n. 12-13), 1 juv. (from tube n. 1058-1060).

Description. — ♀ 5.5 mill. long. Cephalothorax red-brown, clothed with yellow-white hairs partly rubbed off, darker at the edges where there is an irregular marginal line and behind; cephalic part black-brown, its length half the one of the thoracic part; clypeus paler. Eye-lashes short, yellowish white; beard more deeply coloured, scarce. Anterior eyes disposed in a slightly recurved row, nearly equidistant, separated from one another by one seventh of the diameter of the median ones; diameter of the lateral ones not quite half the one of the medians; ocular trapeze a little narrower behind. Falces rather bright red-drab. Sternum brown; maxillae drab. Palp yellow, tibia and tarsus more coloured, tibia with a brownish spot on its upperside. Legs yellow with a wide, irregular, brown, basal ring round first femora and another narrow, apical one; these rings more or less broken off on the upperside; first tibiae with two brown spots, patellae with one on both sides; hind legs with more numerous brown spots. Metatarsus I armed with 2.2 lower spines and an anterior, basal, lateral one, tibia I with 3.3 lower spines; metatarsus II with 2.2 lower spines and two anterior lateral ones, tibia II with 3 (posterior)-1 (anterior) lower spines. Abdomen brown with a double series of little spots forming recurved lines behind; underside yellow; spinnerets brownish-drab.

Male unknown.

Remark. — These are two species, very near one another, which do not resemble typical *Phlegra*, the latter especially because of its first metatarsi armed with lateral spines.

88. Phlegra memorialis (O. P. Cambridge) 1876.

(pl. VI, fig. 9)

Attus memorialis O. P. Cambridge, Proc. Zool. Soc., 1876, p. 617.

Locality. — Siwa, 20-30.VI, 1 ♂.

Distribution. — Upper Egypt (Cambridge, 1876).

Remark. — I think this spider is correctly identified; but the cephalothorax is orange-yellow in colour with the cephalic part black.

89. Aelurillus conveniens (O. P. Cambridge) 1872 (?)

(pl. VI, fig. 10)

Salticus conveniens O. P. Cambridge, Proc. Zool. Soc., 1872, p. 336.

Locality. — Siwa, 4.IX, 1 ♀.

Distribution. — Palestine : Jerusalem (Cambridge, 1872).

Remarks. — I think I am right in attributing this spider to *Ae. conveniens*, only the male of which is known so far, and I will describe the female :

♀ 5.3 mill. long. Cephalothorax dark red-brown, densely clothed with thick drab hairs; a few long, fine black hairs in front also, but rarer beside the eyes; clypeus paler. Eye-lashes and beard drab. Anterior eyes disposed in a recurved row, diameter of the lateral eyes not quite half the diameter of the median ones; median eyes about half their radius apart; distance between median and lateral eyes equal to 1/3 of the diameter of the median ones. Falces light red-brown. Sternum brownish. Palp yellow furnished with white hairs. Legs yellow with brown rings more or less truncated. Metatarsi I and II armed with 2.2 lower spines, tibiae I and II with 3.3 lower spines, the two median and basal anterior ones being rather lateral. Abdomen brownish clothed with pale-drab hairs mixed with a few brown ones; in the front part is a rather wide, but irregular, darker brown longitudinal stripe with three little whitish spots on each side, the two fore ones nearer each other; in the hind half is a double row of little whitish spots which lie pogressively closer together towards the posterior end; underside yellowish spotted with a few irregular white points; spinnerets paler.

This spider belongs to the group of *Ae. affinis* (Lucas) to which it is very nearly allied, as well as to *Ae. gesticulator* (Lucas) and *Ae. pallidemaculatus* J. Denis.

90. Aelurillus mallezi spec. nov.

(pl. VI, fig. 11)

Locality. — Siwa, 20-28.V, 1 ♀.

Description. — ♀ 7 mill. long. Cephalothorax red-brown; length of the cephalic part half that of the thoracic one; cephalic part clothed with red-drab hairs and a few fine black ones; the hairs on the thoracic part have been rubbed off, but the beginning is to be seen of white marginal stripes and of two wider ones from the inner hind part of posterior eyes; clypeus reddish-drab; eye-lashes white; beard scarce, formed of long, fine, pure white hairs chiefly at the margin. Anterior eyes disposed in a recurved row, the tops of the medians being at the level of the centre of the lateral ones; distance between median eyes equal to 1/7 of their diameter; distance between median and lateral eyes not quite equal to 2/7 of the diameter of the median ones; diameter of the lateral eyes not quite half the diameter of the median ones. Falces red-drab with a very small tooth as their posterior margin. Sternum dirty yellow. Palp yellow furnished with white hairs. Legs pale drab with three indistinct, truncated rings round femora and other still more indistinct ones round the other segments; femur, tibia and metatarsus III respectively shorter than the corresponding segments in the fourth pair. Metatarsus I armed with 2.2 lower spines, tibia I with 3.3 lower spines and an anterior lateral one; metatarsus II with 2.2 lower spines and 2 anterior lateral ones; tibia II with 3 (pnsterior)-1 (anterior) lower spines and 2 anterior lateral ones. Abdomen drab spotted with brown, much darker in a wide dorsal stripe, thickly clothed with drab and white hairs; underside pale drab furnished with scarce, fine white hairs; spinnerets brown on their upperside, drab beneath.

Male unknown ?.

Remarks. — Unless it is the female of a species of which the male alone is known, I think this spider is a new one; it resembles a *Phlegra* by its cephalothorax, but the epigyne and spines of first legs place it in the geuus *Aelurillus*.

I take pleasure in naming it after my elder Schoolfellow, Mons. A. Mallez, Ingénieur des Arts et Manufactures, who was interested in my arachnological researches.

91. Mogrus bonneti (Audouin) 1825.

(pl. V, figs. 10-12)

Attus bonnetii Audouin, Descr. Eg., Hist. Nat., XXII, 1825, p. 170, pl. VII, fig. 14.
Attus bonnetii O. P. Cambridge, Proc. Zool. Soc., 1876, p. 611.

Localities. — Siwa, 20-28.V, 1 ♀ (from tube n. 727-728); 16.VII, 1 juv (n. 110); 1.VIII, 1 ♀ (from tube n. 337-338); 10.VIII, 2 ♀♀ from *Tamarix* (from tube n. 824-833); 16-18.VII, 1 ♀, 7 juv. (from tube n. 453-462); 27.VIII, 1 ♂, 1 juv. (n. 537-538); 28.VIII, 4 juv. (from tube n. 539-543); 30.VIII, 10 juv. (from tube n. 86-92). Siwa depression, 22.VIII, 2 ♂♂, 4 juv. from *Acacia* trees (n. 503-509). Khamissa, 22.VI, 1 ♂, 3 juv. (n. 940-944); 5.VIII, 4 juv. (from tube 959-963), 1 ♀, 2 juv. El Arig, 7-8.VI, 1 ♀ (n. 862). Baharein, East Lake shore, 13.VI, 1 ♀ (M. Cameron). Girba, 12.VIII, 1 ♂ (n. 893).

Distribution. — Palestine: plains of the Jordan (Cambridge, 1872, p. 323, *Salticus canescens*, sec. Cambridge, 1876). Egypt: Alexandria, desert near Jebel y Silsilis (Cambridge, 1876); Bir Hooker (Simon, 1899 a, p. 244).

Remark. — A spider very variable in colour.

Paraneaetha gen. nov.

Cephalothorax rather deep in profile, its greatest thickness at the level of hind eyes where it is very much swollen without being really tuberculated, sloped behind posterior eyes; from above longer than wide, its greatest width at the level of posterior eyes being five-sixths of its length, its width in front being three-quarters of its greatest width; edges rather rounded in front to the level of the posterior hind eyes, attenuated behind where its width is half the front one. Ocular trapeze disposed on the front half of the cephalothorax, its width in front equal to 9/10 of its width behind, its length equal to 7/10 of its greatest width; posterior, hind eyes overreaching the sides of the cephalothorax. Median eyes equally distant from the front eyes and the hind ones. Front eyes disposed in a straight row by their tops, the medians more than twice as large as the lateral ones, very narrowly separated from each other. Stria very short, almost a point, scarcely conspicuous, situated between hind eyes, more in front than in *Neaetha*. Sternum elongated, its length equal to 1 1/2 times its width, very slightly attenuated in front, the front coxae being separated by the width of the lip. Falces weak with their fang rather short, slightly curved; upper margin armed with two little black teeth, lower one smooth. First legs strong with stout and short femora; metatarsus with 2.2 lower spines, tibia with 3.2 lower spines, the posterior apical one lacking, patella without any spine. Legs of the second pair much shorter and more slender, metatarsus with 2.2 lower spines, tibia with one posterior sub-basal lower spine and an anterior lateral one situated at about the middle, but in the apical half; patella with an anterior, nearly apical, lateral spine rather upper. Legs of the third pair very long, much more than the fourth ones and armed with more numerous spines; metatarsus III with two groups of spines; tibia III with a group of spines in the apical half, another at about the middle, an upper sub-basal spine and an anterior apical, little lower one; patella III with a spine on both sides. Metatarsus IV armed with an apical group of spines and a lateral spine on both sides; tibia IV with a posterior lateral spine in the apical half and an anterior apical lower spine; patella IV with a posterior lateral spine

Genotype : *P. diversa* spec. nov.

92. Paraneaetha diversa spec. nov.

(pl. V, fig. 13)

Locality. — Khamissa, 5.VIII, 1 ♀.

Description. — ♀ 3.8 mill. long, cephalothorax 1.8 mill. Cephalothorax orange yellow having the eyes circled with black, the anterior ones narrowly, the posterior ones very widely; the spots which the median eyes are in, merge more or less behind with the posterior ones and are joined by a interrupted line behind the anterior eyes; white hairs on the black spots on the sides of the cephalothorax; orange-coloured hairs very dense between the front black line and the anterior eyes; eye-lashes white; long white hairs scattered on the clypeus, converging towards the centre; on the edge of the clypeus is a series of stiff, thick hairs directed perpendicularly and not overreaching on each side the centre line of the falces; hairs on the remaining of the cephalothorax rubbed off, paler behind. Clypeus yellow. Distance betwen antero-median eyes equal to 1/12 of their diameter; distance between antero-median and antero-lateral eyes only just greater; diameter of the former equal to 2.2 times the diameter of the latter. Sternum yellow slightly stained with brown in front; lip and maxillae yellow, stained with brown, paler white at the apex. Falces orange yellow scarcely stained with brown on their front side, furnished with a few fine, rather short hairs on their outer side and at the apex. Palp and legs pale yellow furnished with rather fine, white hairs. Metatarsus I = tarsus I = 3/5 tibia I; patella I thin at its basis (withdrawn owing to alcohol ?). Tibia III = 1.35 patella III. Patella III + tibia III = 1.9 (Metatarsus III + tarsus III). Patella III + tibia III = 1.9 (Patella IV + tibia IV); tibia III = 1.95 tibia IV; patella III = 1.85 patella IV. Tibia IV = 1.28 patella IV; patella IV + tibia IV = 1.07 (Metatarsus IV + tarsus IV). Abdomen elongated oval, a little more rounded in its anterior half, with two very small, widely separated points slightly in front of its middle, clothed on its upperside with very dense, white hairs; underside yellow with a few fine, scattered hairs; spinnerets long, the lower ones adjoining each other.

Male unknown.

Remark. — This genus seems to be near *Neaetha* from which it differs in the smooth lower margin of the falces.

93. Neaetha aegyptiaca spec. nov.

(pl. V, figs. 14-16)

Localities. — Siwa, 10.VII, 1 ♂ (n. 272). Pond n. 19, Ilrhābit Uncorde. 18.VII, 1 juv. ?. Sitra, 14-16.VI, 1 ♀ (from tube n. 12-13). Gara, 4.VII, 1 ♀, 1 juv. (n. 875-876).

Description. — ♂ 4.6 mill. long. Cephalothorax rather bright red-drab with a black marginal line, slightly stained with blackish behind and on the ocular area; eyes on black spots; a few fine black hairs on the hind slope and the sides of the thorax; fine white hairs in front above the black ones, other ones, more dense, at the margin; cephalic part slightly shorter than the thoracic part. Eye-lashes drab mixed with a few white ones; short, white beard. Anterior eyes disposed in a slightly recurved row by their tops, the median ones nearly adjoining one another; distance between median and lateral eyes equal to three times the distance between median eyes; diameter of the lateral eyes equal to half the diameter of the median ones. Falces light red-drab. Sternum orange-yellow, lip and maxillae pale. Palp: femur and patella yellow covered with white hairs; tibia and tarsus red-drab furnished with drab hairs mixed with white ones at the apex of the tarsus. Legs orange-yellow with their femora paler underneath, their tibiae and tarsi more coloured, chiefly those of the first pair. Patella I armed with one lateral spine on both sides. Abdomen white, the hairs rubbed off, in its fore half it has a very pale, red-drab, longitudinal stripe, bifid behind, followed by two points of the same colour, widely separated from one another.

♀ 4.4 mill. long. Cephalothorax drab-brown, paler on the thoracic part except behind and on the sides; eyes on large black spots; which pubescence, mostly rubbed off; cephalic part shorter than the thoracic part; eye-lashes and beard white; a little longitudinal stria between hind eyes. Anterior eyes disposed in a nearly straight row by their tops, distance between median eyes squal to 1/6 of their diameter, distance between median and lateral eyes slightly greater; diameter of the lateral eyes equal to half the diameter of the median ones; trapeze formed by the eyes slightly wider behind than in front. Falces pale reddish-drab. Sternum yellow, lips red-brown, maxillae white at their inner end. Palp pale yellow furnished with long white hairs, legs yellow, tibiae I a little more orange coloured. Metatarsi I and II armed with 2.2 lower spines; tibia I with 3.3 lower spines and 2 (median and basal) anterior lateral ones; tibia II with 3.2 lower spines (the basal anterior one lacking, the second ones not exactly facing each other) and 2 anterior lateral ones; patellae I and II with an anterior spine on both sides; metatarsus III with two groups of spines; metatarsus IV with three groups of spines, the basal one being reduced to two spines. Abdomen whitish, grey on its underside, densely clothed with mixed white and bright red-brown hairs and a few longer, fine, black ones; the whole is rather reddish, but very rubbed off.

94. Thyene imperialis (W. Rossi) 1846.

Salticus imperialis W. Rossi, in Haidenger, Naturwiss. Alt., I, 1846, p. 12.
Salticus moreletii H. Lucas, Expl. Alg., Arachn., 1846, p. 147, pl. VI, fig. 3.
Attus regillus L. Koch, Verh. Ges. Wien, 1867, p. 879.
Attus argenteomaculatus E. Simon, Ann. Soc. Entom. Fr., (4) VIII, 1868, p. 620.
Attus moreletii E. Simon, ibid., 1868, p. 622.
Attus regillus E. Simon, ibid., 1868, p. 622.
Attus imperialis E. Simon, Ann. Soc. Entom. Fr., (5) I, 1871, p. 142.
Attus moreletii E. Simon, ibid., 1871, p. 142.
Attus regillus O. P. Cambridge, Proc. Zool. Soc., 1876, p. 611, pl. LX, fig. 17.
Thya imperialis E. Simon, Arachn. Fr. III, 1876, p. 52, pl. XI, fig. 16.
Thyene imperialis E. Simon, Arachn. Fr., VI 2e éd., II (4), 1903, p. 683, figs. 811 and 814 C.
Thyene imperialis E. Simon, Arachn. Fr., VI (5), 1937, p. 1234, figs. 2003-2004.

Localities. — Siwa, 20-28.V, 2 ♂♂ subad., 3 juv. (n. 739-748); 4.VI, 1 ♂ (from tube n. 256-257); 9.VII, 4 juv. (from tube n. 186-190); 18.VII, 3 juv. (form tube n. 191-197); 21.VII, 1 juv. (from tube n. 288-292); 26-29. VII, 1 ♂ subad. (n. 332); 1.VIII, 1 juv. (from tube n. 337-338); 9.VIII, 1 juv. (from tube n. 400-410) ; 13.VIII, 1 ♀ (from tube n. 415-419) ; 14.VIII, 3 juv. (from tube n. 415-418) ; 15.VIII, 1 juv. (from tube n. 428-437) ; 16-19.VIII, 4 juv. (from tube n. 453-462) ; 30.VIII, 10 juv. (n. 93-96) ; 31.VIII, 1 juv. (from tube n. 45-46) ; 4.IX, 4 juv. ; 8.IX, 1 juv. (n. 665). Siwa Tarterad, 18.VII, 1 ♂ (n. 836). Sitra, 14-16.VI, 1 juv. (n. 1065). Khamissa, 5.VIII, 1 ♀ subad., 1 juv. Pond n. 47, Anas Yutra, 6.V, 1 ♀ subad. Pond n. 55, Koreishid, 29.VIII, 1 juv.

Distribution. — Spain : Andalusia (Grenada) (Simon, 1868, *Attus argenteomaculatus*, *Attus moreletii*) ; Cartagena (Simon, 1868, *Attus moreletii*). Corsica (Simon, 1871, *Attus i;* 1937, p. 2269). Italy (Simon, 1871, *Attus i*). Sicily (Simon, 1876 b). Dalmatia (after Bristowe, 1934, p. 773). Greece : Tinos (L. Koch, 1867 ; Simon 1868, *Attus regillus ;* Simon, 1884 a, p. 310) ; Syra (Simon, 1884 a, p. 310) ; Kastelorizo (after Bristowe, 1934, p. 773). Turkey (Simon, 1868, *Attus argenteomaculatus*). Asia Minor : Ephesus (Cambridge, 1872, p. 323, *Salticus regillus ;* 1876) ; Smyrna (Cambridge, 1876). Syria (Simon, 1871, *Attus i*) ; Ataïbé, Damascus oasis (Gadeau de Kerville, 1926, p. 70). Palestine : plains of the Jordan (Cambridge, 1872, p. 323, *Salticus regillus*). Yemen : Aden (Simon, 1882, p. 213 ; 1890 a, p. 117) ; Hodeïda (Simon, 1890 a, p. 117). India : Bombay (Cambridge, 1876) ; North of India (Simon, 1901, p. 31). Burma : Minhla, on Irawaddy River (Simon, 1884 c, p. 326, *Thya i*) ; Tharrawaddy (Thorell, 1895, p. 377). Philippine Islands (after Thorell, 1895, p. XXXVI). Java (Thorell, 1892, p. 387). Erythraea : Adi Ugri (Reimoser, 1937, p. 23). Abyssinia (Simon, 1901, p. 31) : Magala re Umberto, Hanacio (Pavesi, 1897, p. 183) ; Bogos, Metemma (Pavesi, 1883, p. 101, *Thya i*) ; Bardera (Pavesi, 1895, p. 527, *Thiene orbicularis*) ; Ginir-Daua, Akaki on Djam-Djam (Strand, 1909, p. 24). East Africa, in desert (Simon, 1901, p. 31). Central Africa : Caragua (Pavesi, 1897, p. 183). Anglo-Egyptian Soudan : Khor Attar, Gondokoro (Simon, 1906, p. 1175) ; Philoe Island, Khartum, White Nile from ed Dueim to Shellal Gebelein, Abba Island (Simon, 1907 a, p. 9). Egypt (Simon, 1878, p. 203, *Thya i*) ; Cairo, Upper Egypt (Cambridge, 1876). Libya : Giarabub (di Caporiacco, 1928, p. 105) ; Oasis of Sockna (Karsh, 1881, p. 5, *Thya i*) ; Derna (di Caporiacco, 1934, p. 19) ; Benghazi (Simon, 1908 a, p. 437). Tunis : Sidi-el-Hani (Simon, 1885, p. 1, *Th. i.* and *moreleti*) ; El Djem (Simon, 1885, p. 1, *Th. moreleti*). Algeria : La Calle (Lucas, 1846) ; Terga (Strand, 1909, p. 24). Morocco : Mogador (Simon, 1909 a, p. 41). Canary Islands (Simon, 1937, p. 1269).

Remark. — Very pale examples with black spots very well marked on the abdomen.

95 Thyenula ammonis spec. nov.

(pl. VI, figs. 12-13)

Locality. — Khamissa, 5.VIII, 1 ♂.

Description. — ♂ 6 mill. long. Cephalothorax rather bright, red-brown, darker behind and narrowly on the sides; eyes disposed in a rather wide horse-shoe shape, black spot, narrowly broken off between the median eyes and the hind ones; cephalothorax covered with short, fine, black hairs on the edges, behind posterior eyes where they form a stripe and at the hind part where they are mixed with white ones; cephalic part clothed with scaly, iridescent, white hairs; two submarginal stripes of white hairs converge before posterior eyes; a few white hairs form a little oval spot behind posterior eyes; eye-lashes brownish; beard long, white. Anterior eyes disposed in a straight row by their tops, the medians nearly adjoining one another, a little more separated from the lateral ones, diameter of the lateral eyes equal to 1/3 of the diameter of the medians; width of the ocular trapeze in front equal to 9/10 of the width behind. Falces red-brown. Sternum brown. Palp red-brown furnished with white hairs, much resembling that of *Thyene*. *Legs* red-brown with darker femora; second pair paler; tarsi III and IV yellow; metatarsi paler on their upperside; tibiae paler except on their sides. First legs strong with their metatarsi, tibiae and patellae fringed beneath with black hairs; metatarsi I and II with 2.2 lower spines, tibia I with 3.3 lower spines, tibia II with 3.1 (anterior apical) lower spines, patellae I and II without any spine, metatarsus III with 2 groups of spines, tibia III with 2 lateral spines on both sides, patella III with an anterior lateral spine, metatarsus IV with 2 groups of spines, tibia IV with 2 posterior lateral spines, patella IV without any spine. Abdomen blackish brown, a little iridescent, brown-drab on its upperside clothed bright red-drab forming a very wide stripe as wide as the abdomen in the hind two-thirds, thinner in front; two little white points in the thinner part, two larger ones on the sides of the median stripe where it widens; in the hind half, two transverse white lines not uniting in the middle line; behind two little white points: on both sides, three oblique, white lines.

Female unknown.

Remarks. — This spider much resembles a *Thyene*, but the cephalothorax is not so wide, its length equalling but 1.3 times its width, the sides are rather regularly bent and the whole looks like that of *Paramodunda thyenioides* Lessert (1925, p. 469, fig. 55). Front eyes and spines of tibia II are those of *Thyenula*, however spines under first and second are as short and strong as in *Thyene*, in the same way lateral front eyes are very near the median ones. The genus *Thyenula* was known hitherto by only one species from Cape Colony.

96. Eugasmia (?) occidentalis spec. nov.

(pl. V, fig. 17; pl. VI, figs. 14-15)

Localities. — Siwa, 15.VIII, 1 ♂ (from tube n. 428-437). Khamissa, 5.VIII, 2 ♀♀.

Description. — ♂ 4 mill. long. Cephalothorax brown with the cephalic square blackish, furnished with white hairs in front and on the sides, and with two rather wide, parallel, longitudinal stripes of white hairs slightly overreaching hind eyes in front; eye-lashes brownish; beard very thick and white. Anterior eyes disposed in a slightly recurved row; distance between median eyes equal to 1/7 of their diameter; distance between median and lateral eyes equal to 2/7 of the diameter of the median ones; diameter of the lateral eyes equal to 3/7 of the diameter of the median ones; ocular trapeze slightly wider behind than in front. Falces rather light brown; sternum yellow, blackish at the margin. Palp yellow furnished with white hairs. Legs yellow. Metatarsi I and II armed with 2.2 lower spines and 2 lateral ones on both sides; tibiae with 3.2 (anterior) lower spines (anterior ones doubtful in number), 2 anterior spines and 1 posterior lateral ones; patellae with one lateral spine on each side; metatarsi III and IV as in the female. Abdomen yellowish clothed with white hairs with on its upperside a rather narrow stripe of brown hairs (a few orange-coloured ones in front), wider in front, with its edges in straight line.

♀ 5.5 and 5.2 mill. long. Cephalothorax drab with the cephalic part dark brown, clothed with whitish hairs, overreaching behind posterior eyes, limited by an obtuse recurved line; whitish hairs forming a wide band on both sides of the thoracic part, meeting together behind; clypeus reddish-drab; eye-lashes white; irregular beard white. Anterior eyes disposed in a slightly recurved row; distance between median eyes equal to 1/9 of their diameter; distance between median and lateral eyes nearly equal to 1/3 of the diameter of the median ones; diameter of the lateral eyes half the diameter of the median ones; ocular trapeze wider behind. Falces red-brown; sternum yellowish, slightly attenuated in front; lip and maxillae red-brown, the former whitish at its apex, the latter at the inner angle. Palp and legs yellow; metatarsus I = 1.25 metatarsus II; metatarsi III and IV about as long as tibiae. Femora armed with 2 dorsal spines and at their apex with a row of four spines; metatarsi I and II armed with 2.2 lower spines (the apical ones rather lateral) and with 2 lateral spines on both sides; tibia I armed with 3.2 (anterior, the subapical one lacking) lower spines, and with 3 anterior lateral spines not exactly disposed on the same row; tibia II with 3 posterior lower spines, with 1 posterior lateral spine and with 3 anterior lateral ones disposed as in the first pair; patellae I and II with one spine on both sides; metatarsi III with 2 groups of spines, the basal one formed by 5 spines, the dorsal rather more advanced; metatarsi IV, with 3 groups of spines. Abdomen yellowish, slightly blue-black in front continued in a narrow stripe segmented behind, clothed with yellow and reddish hairs, a few fine black hairs.

Remark. — Spines on third legs and beard in male (possibly partly fallen in female) make these spiders allied to the genus *Eugasmia* which was known hitherto only from the Indian region; I think this species is correctly attributed to the genus.

QUADROSTIATAE

Fam. OONOPIDAE

97. Gamasomorpha margaritae spec. nov.

(pl. IV, figs. 13-15)

Locality. — Siwa, 27.VIII, 1 ♀.

Description. — ♀ 1.3 mill. long. Cephalothorax orange-yellow, very slightly striated on its sides; wider behind than in front, wider at the level of coxae II and towards coxae III; rather thick and flat, but abruptly sloping behind (as in *G. kulczynskii* Berland); clypeus very narrow, equalling the third part of an anterior eye, Anterior eyes not quite their radius apart, slightly larger than the median ones; the postero-lateral ones the smallest. Sternum rather like *G. kulczynskii*, but its hind part more square, less lengthened; yellow with sunk points; maxillae more rounded than in *kulczynskii.* Palp and legs yellow with red articulations. Abdominal scuta orange-yellow, the posterior one annular, very pale, scarcely visible.

Remarks. — As far as it is possible to say with these minute spiders, this one seems to be nearly allied to *G. kulczynskii* of which only the male is known. However the eyes are more unequal in size, the cephalothorax more rounded in front and, although the epigastric region is rather similar in shape, I dare not attribute this female to a male found very far indeed from Libya, *viz.* on the coast of East Africa.

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EXPLANATION OF PLATE I.

Fig. 1. — *Altella libyca* sp.n.: epigyne.

Fig. 2. — *Agelena lepida deserta* di Capor.: patella and tibia of male palp from the outer side.

Fig. 3. — *Lycosa ferox* Lucas : tarsus of male palp from below.

Fig. 4. — *Lycosa ferox* Lucas : bulb of the male from the outer side.

Fig. 5. — *Lycosa ferox* Lucas : epigyne.

Fig. 6. — *Lycosa urbana* (O. P. Cambr.) : tarsus of male palp from below.

Fig. 7. — *Lycosa urbana* (O. P. Cambr.) : tarsus of male palp from the outer side.

Fig. 8. — *Arctosa ambigua* sp.n.: epigyne.

Fig. 9. — *Arctosa quadripunctata* (Lucas) : tarsus of male palp from the outer side.

Fig. 10. — *Arctosa quadripunctata* (Lucas) : epigyne.

Fig. 11. — *Pardosa venatrix* (Lucas) : tarsus of male palp from below.

Fig. 12. — *Pardosa venatrix* (Lucas) : male palp from the outer side.

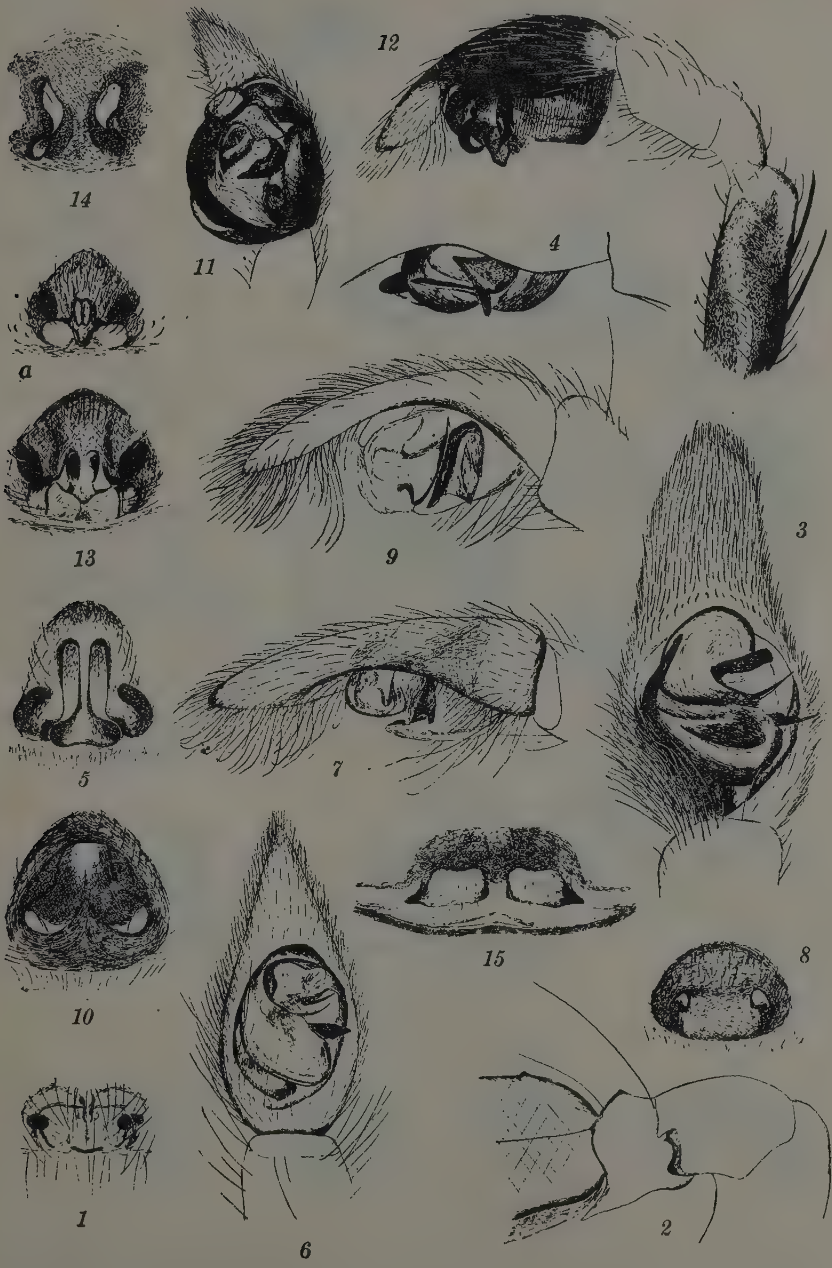
Fig. 13. — *Pardosa venatrix* (Lucas) : epigyne; *a*, another form.

Fig. 14. — *Evippa ungulata* (O. P. Cambr.) : epigyne.

Fig. 15. — *Peucetia arabica* E. Simon : epigyne.

Jacques Denis

Plate I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EXPLANATION OF PLATE II.

Fig. 1. — *Argyrodes ammonis* sp.n. : profile of male without palp nor legs.

Fig. 2. — *Argyrodes ammonis* sp.n. : profile of the front part of the cephalothorax of male more magnified.

Fig. 3. — *Argyrodes ammonis* sp.n. : male palp from the outher side.

Fig. 4. — *Argiope clarki* (Blackwall) : epigyne.

Fig. 5. — *Argiope lobata* (Pallas) : epigyne (as comparison).

Fig. 6. — *Larinia chloreis* (Audouin) : epigyne.

Fig. 7. — *Larinia ovata* sp.n. : end of male palp from the outer side and slightly from below.

Fig. 8. — *Larinia ovata* sp.n. : end of male palp from below.

Fig. 9. — *Larinia ovata* sp.n. : epigyne.

Fig. 10. — *Araneus suspicax* (O. P. Cambridge) : tibia and tarsus of male palp from below.

Fig. 11. — *Araneus suspicax* (O. P. Cambridge) : epigyne.

Fig. 12. — *Eusparassus dufouri oraniensis* (Lucas) : epigyne.

Fig. 13. — *Eusparassus letourneuxi* (E. Simon) : epigine (as comparison).

Fig. 14. — *Eusparassus walckenaeri* (Audouin) : male palp from below.

Fig. 15. — *Eusparassus walckenaeri* (Audouin) : tibial apophysis of male palp from the outer side.

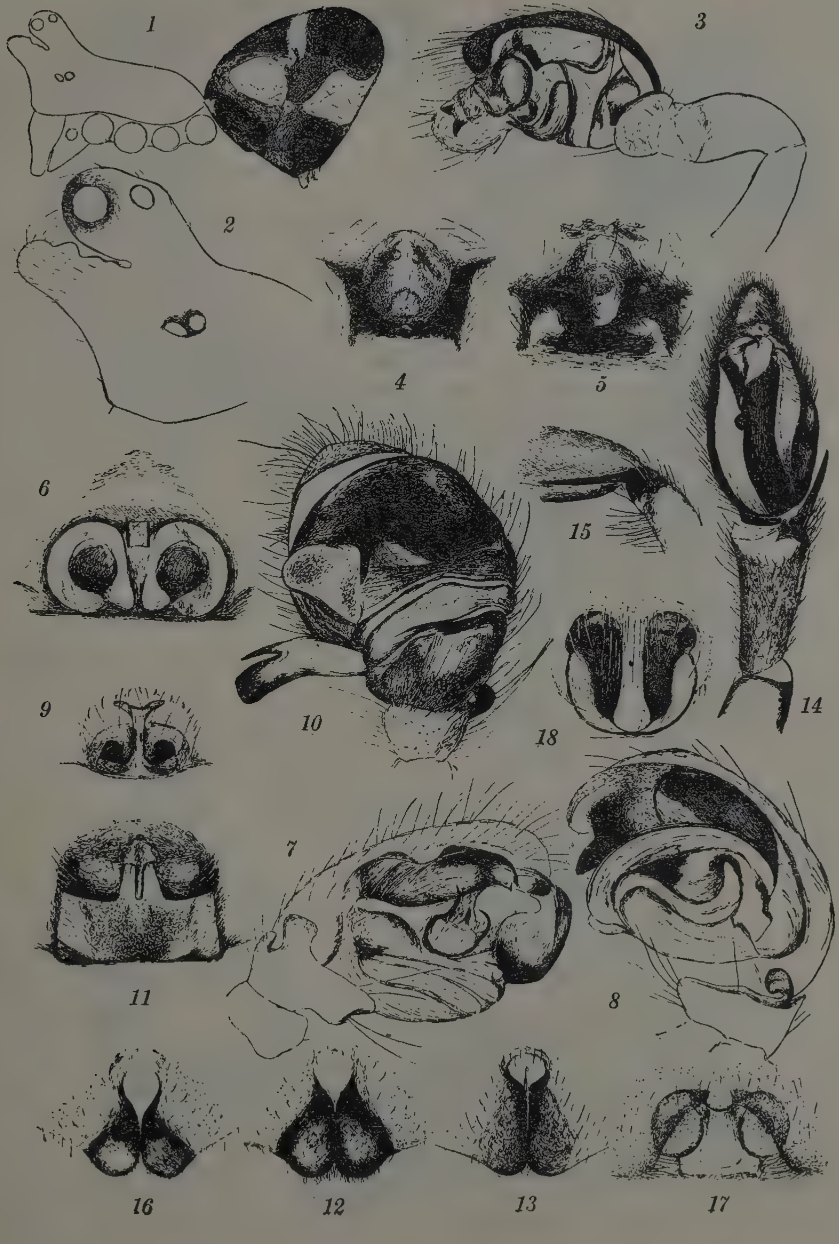
Fig. 16 — *Eusparassus walckenaeri* (Audouin) : epigyne.

Fig. 17. — *Olios impediens* sp.n. : epigyne.

Fig. 18. — *Thanatus fabricii* (Audouin) (?) : epigyne.

Jacques Denis

Plate II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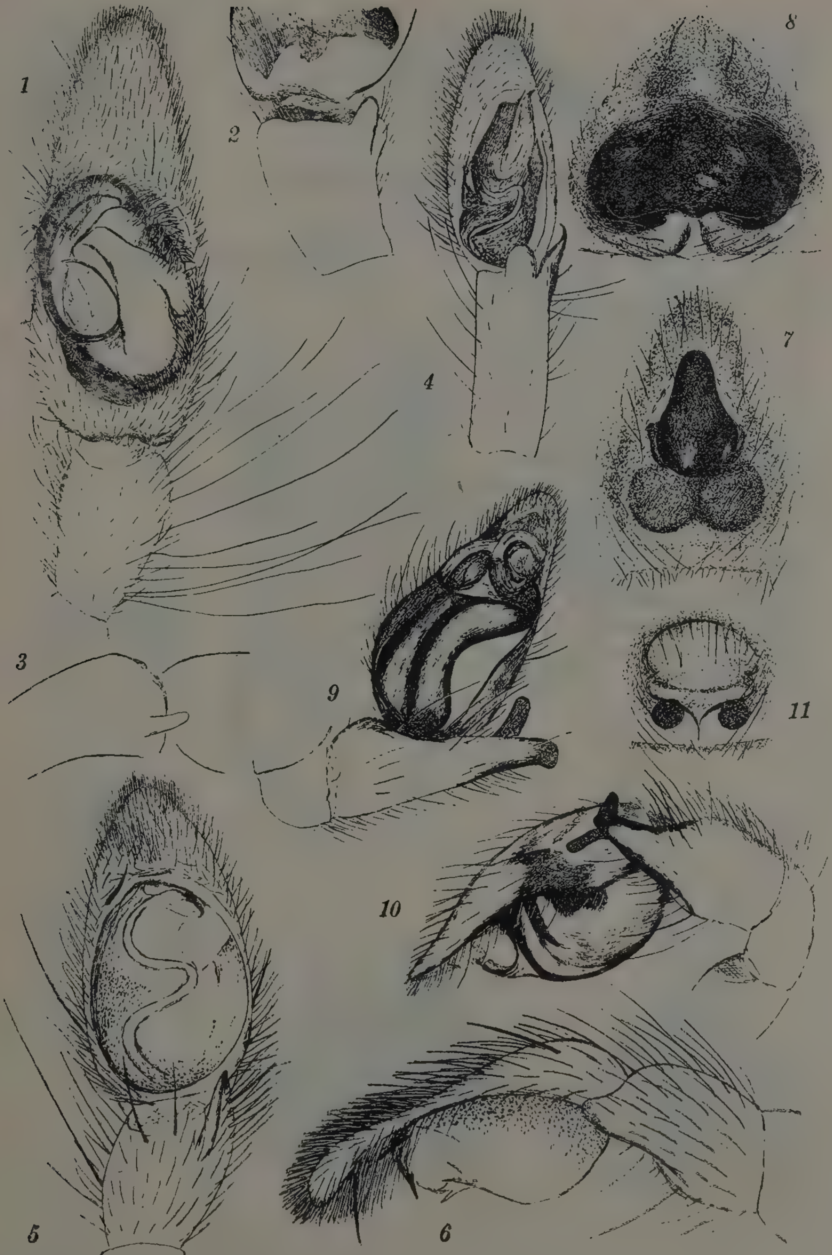
EXPLANATION OF PLATE III.

Fig. 1. — *Cerbalus concolor* sp.n. : male palp from below.
Fig. 2. — *Cerbalus concolor* sp.n. : tibia of male palp from above.
Fig. 3. — *Cerbalus concolor* sp.n. : tibia of male palp from the outer side.
Fig. 4. — *Philodromus omer-cooperi* sp.n. : male palp from below.
Fig. 5. — *Thanatus fabricii* (Audouin) (?) : male palp from below.
Fig. 6. — *Thanatus fabricii* (Audouin) (?) : male palp from the outer side.
Fig. 7. — *Zelotes razoumowski* (Pavesi) : epigyne.
Fig. 8. — *Poecilochroa lesserti* sp.n. : epigyne.
Fig. 9. — *Poecilochroa lesserti* sp.n. : male palp from the outer side and below.
Fig. 10. — *Poecilochroa lesserti* sp.n. : male palp from the outer side.
Fig. 11. — *Berlandina jovia* sp.n. : epigyne.

Jacques Denis

Plate III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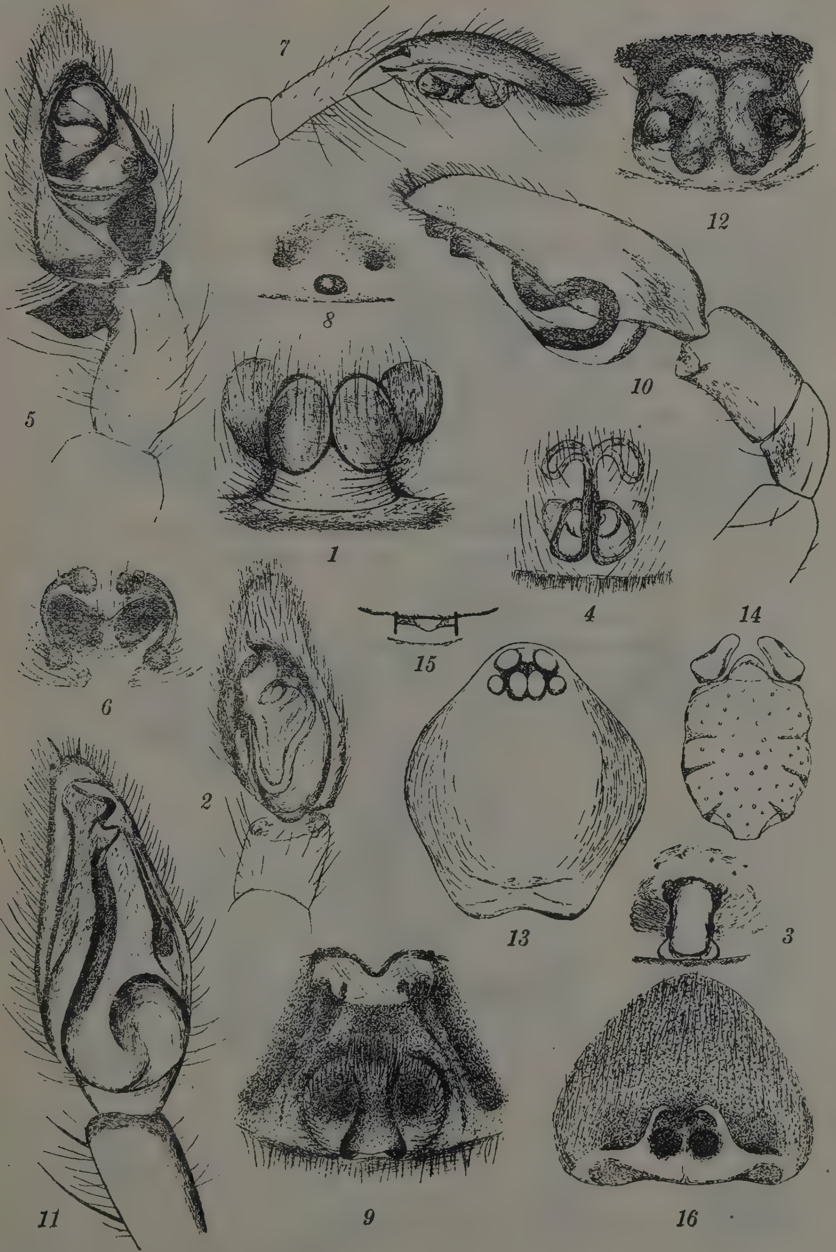
EXPLANATION OF PLATE IV.

Fig. 1. — *Agelena lepida deserta* di Capor. : epigyne.
Fig. 2. — *Thanatus albini* (Audouin) (?) : male palp from below.
Fig. 3. — *Thanatus albini* (Audouin) (?) : epigyne.
Fig. 4. — *Zelotes intricatus* sp.n. : epigyne.
Fig. 5. — *Pterotricha isiaca* Dalmas : male palp from below.
Fig. 6. — *Chiracanthium jovium* sp.n. : epigyne.
Fig. 7. — *Chiracanthium tenue* sp.n. : male palp from the outer side.
Fig. 8. — *Chiracanthium tenue* sp.n. : epigyne.
Fig. 9. — *Cosmophasis cincta* sp.n. : epigyne.
Fig. 10. — *Castaneira antinorii* (Pavesi) : male palp from the outer side.
Fig. 11. — *Castaneira antinorii* (Pavesi) : male palp from below.
Fig. 12. — *Castaneira antinorii* (Pavesi) : epigyne.
Fig. 13. — *Gamasomorpha margaritae* sp.n. : cephalothorax of female.
Fig. 14. — *Gamasomorpha margaritae* sp.n. : sternum.
Fig. 15. — *Gamasomorpha margaritae* sp.n. : epigastric furrow of female.
Fig. 16. — *Menemerus animatus* (O. P. Cambridge) : epigyne.



EXPLANATION OF PLATE V.

Fig. 1. — *Heliophanus albescens* sp.n. : femoral and tibial joints of male palp from the outer side.

Fig. 2. — *Heliophanus albescens* sp.n. : outer femoral apophysis from in front.

Fig. 3. — *Heliophanus albescens* sp.n. : epigyne.

Fig. 4. — *Evophrys fulgens* (O. P. Cambridge) : epigyne.

Fig. 5. — *Evophrys granulata* sp.n. : epigyne.

Fig. 6. — *Phlegra flavipes* sp.n. : male palp from below.

Fig. 7. — *Phlegra flavipes* sp.n. : tibia of male palp from the outer side.

Fig. 8. — *Phlegra flavipes* sp.n. : epigyne.

Fig. 9. — *Phlegra proxima* sp.n. : epigyne.

Fig. 10. — *Mogrus bonneti* (Audouin) : male palp from the outer side.

Fig. 11. — *Mogrus bonneti* (Audouin) : male palp from below.

Fig. 12. — *Mogrus bonneti* (Audouin) : epigyne.

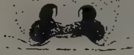
Fig. 13. — *Paraneaetha diversa* sp.n. : epigyne.

Fig. 14. — *Neaetha aegyptiaca* sp.n. : male palp from below.

Fig. 15. — *Neaetha aegyptiaca* sp.n. : tibia of male palp from the outer side.

Fig. 16. — *Neaetha aegyptiaca* sp.n. : epigyne.

Fig. 17. — *Eugasmia (?) occidentalis* sp.n : epigyne.



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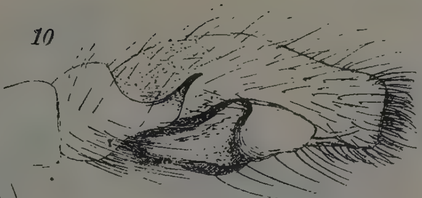

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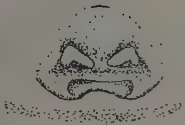

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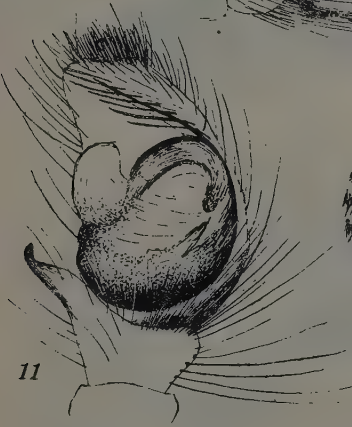

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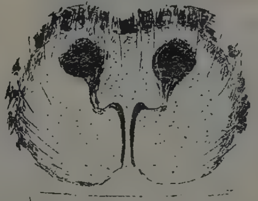

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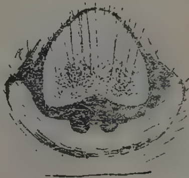

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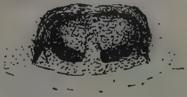

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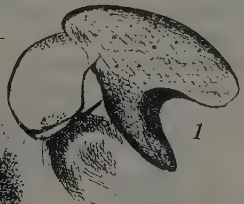

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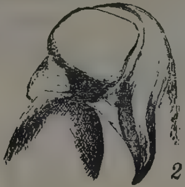

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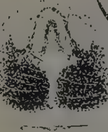

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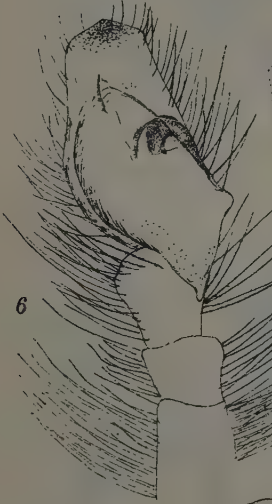

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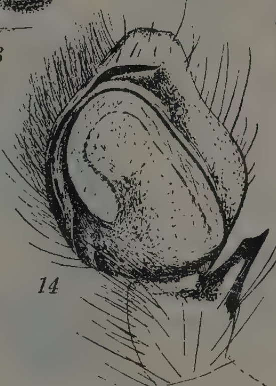

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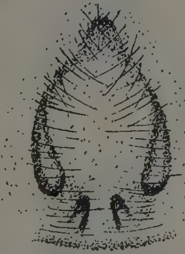

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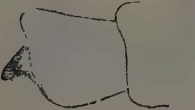

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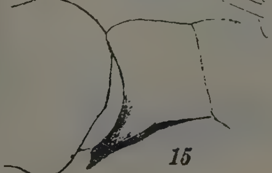

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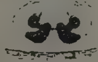

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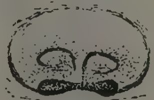

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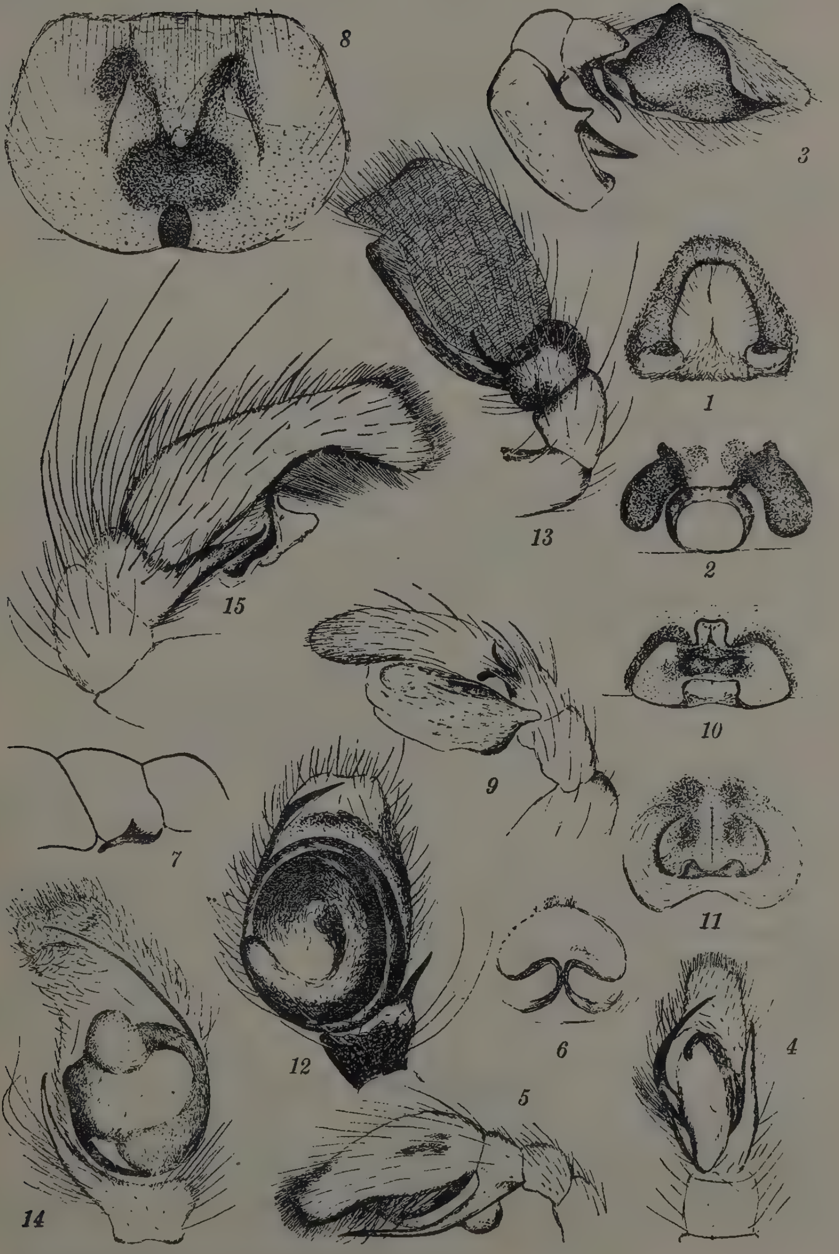
EXPLANATION OF PLATE VI.

Fig. 1. — *Arctosa argentata* sp.n. : epigyne.
Fig. 2. — *Chiracanthium* sp. : epigyne.
Fig. 3. — *Heliophanus albescens* sp.n. : male palp from the inner side.
Fig. 4. — *Pseudicius punctatus* sp.n. : male palp from below.
Fig. 5. — *Pseudicius punctatus* sp.n. : male palp from the outer side.
Fig. 6. — *Pseudicius punctatus* sp.n. : epigyne.
Fig. 7. — *Menemerus soldani* (Audouin) : tibial apophysis of male palp from the outer side.
Fig. 8. — *Menemerus soldani* (Audouin) : epigyne.
Fig. 9. — *Phlegra memorialis* (O. P. Cambridge) : male palp from the outer side.
Fig. 10. — *Aelurillus conveniens* (O. P. Cambridge) : epigyne.
Fig. 11. — *Aelurillus mallezi* sp.n. : epigyne.
Fig. 12. — *Thyenula ammonis* sp.n. : male palp from below.
Fig. 13. — *Thyenula ammonis* sp.n. : male palp from the outer side.
Fig. 14. — *Eugasmia (?) occidentalis* sp.n. : male palp from below.
Fig. 15. — *Eugasmia (?) occidentalis* sp.n. : male palp from the outer side.

Jacques Denis

Plate VI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RESULTS OF THE ARMSTRONG COLLEGE EXPEDITION TO SIWA OASIS (LIBYAN DESERT), 1935

Cicindelidae and *Carabidae*

[Coleoptera]

by E. B. Britton

The collection includes 3 species of Cicindelidae and 10 species of Carabidae, with a total of 329 individuals.

None of the 13 species are endemic, but, on the contrary almost all of them have a wide distribution. Each of the two species of *Cicindela* covers an area from West Africa as far as northern India. Of the 10 species of Carabidae, all are more or less widely distributed in North Africa, 6 occur also in southern Europe, 3 reach southwards to the Sudan and Abyssinia, 3 extend into Palestine, Iraq, etc., while 2 are also found in southern Arabia.

CICINDELIDAE

Cicindela melancholica Fabricius, 1798.

Fabricius, 1798, Ent. Syst. Suppl., p. 63; W. Horn and Roeschke, 1891, Mon. Pal. Cic., p. 130, t. 4, f. 8a; and t. 5, f. 40; Bedel, 1895, Cat rais. Col. N. Afrique, I, p. 13.

Localities : Siwa Depression, Zeitoun, 2.IX.35, 2 examples; Siwa, June-September 1935, 55 examples; Khamissa Depression, 19.VII.35, 1 example; Jagub, 18-19.VIII.35, 3 examples; Maragi, 14 and 26.VIII.35, 3 examples.

Distribution : All parts of Africa, and neighbouring islands, Arabia, Persia and northern India as far as Bengal, the shores and islands of the Mediterranean.

Cicindela aulica Dejean, 1831.

Dejean, 1831, Spec. Col. V, p. 250; W. Horn, 1915, in Wytsman, Gen. Ins., Cic., p. 357; Bedel, 1895, Cat. rais. Col. N. Afrique, I, pp. 5 and 9.

Localities : Siwa, 22.VI.35-23.VII.35, 10 examples; Khamissa, 22.VI.35-28.VIII.35, 11 examples; Khoreishid, 30.VI.35, 1 example.

Distribution : Egypt, Abyssinia (Danakil), Obock and British Somaliland, Greece, Tunisia, Cape Verde Islands, Senegal, Angola, Yemen, Iraq, S. Persia, Karachi.

Megacephala euphratica Letreille and Dejean, 1822.

Latreille and Dejean, 1822, Hist. Nat. Col., I, p. 37, t. I, f. 4; Bedel, 1895, Cat. rais. Col. N. Afrique, p. 2; W. Horn, 1910, in Wytsman, Gen. Ins., Cic., p. 136.

Locality : Siwa, 9.VII.35, 1 example.

Distribution : S. Spain, Algeria to Egypt, Sinai, G. of Tadjura, Cyprus, Caucasus, the Euphrates and Tigris, Persia to the borders of Afghanistan, N. W. Prov. of India.

CARABIDAE

Scarites eurytus Fisch.-Wald., 1825.

Fisch-Wald., 1825, Entomogr. Russ., III, p. 119, t. 5, f. 3; Bedel, 1895, Cat. rais. Col. N. Afrique, p. 39.

Localities : Siwa Depression, 22.VIII.35, 1 example; Siwa, 27-30.VI.35 2 ex., 17.VII, 35, 1 ex., 36.VII.35, 1 ex., 28.VIII.35, 1 ex.; Khamissa, 22.VI.35, 1 ex.

Distribution : Mediterranean countries, Sudan, Abyssinia, Congo, Asia Minor, Persia, Transcaucasus, Transcaspia, Turkestan.

Scarites subcylindricus Chaudoir, 1843.

Chaudoir, 1843, Bull. Soc. Nat. Mosc., XVI, p. 730; Bedel, 1895, Cat. rais. Col. N. Afrique, pp. 40 and 43.

Locality : Khamissa, 28.VIII.35, 1 example.

Distribution : S. Spain, Algeria, Tunis, Egypt, Sudan, Palestine, Syria, Cyprus, Yemen, Asia Minor, Transcaspia.

Dyschirius clypeatus Putzeys, 1866.

Putzeys, 1866, Ann. Soc. Ent. Belg., X, pp. 36 and 59.

Localities : Siwa Depression, 18.V.35, 1 ex.; Siwa, 13.V.35, 2 ex., 22.VII.35, 9 ex., I.VIII.35, 1 ex.; Bahrein, 13.VI.35, 1 ex.

Distribution : Sicily, Algeria, Tripoli, Egypt (G. Ferrante, 1908, *Bull. Soc. Ent. Egypte*, I, p. 116; A. Schatzmayr, 1936, Publ. Mus. Ent. « Pietro Rossi » Duino, n. 1, p. 37).

Tachys socius Schaum, 1863.

Schaum, 1863, Berl. Ent. Zeitschr., VII, p. 92; Bedel, 1896, Cat. rais. Col. N. Afrique, I, pp. 72 and 75.

Localities : Siwa Depression, 25.IV.35, 1 ex.; Siwa, 23.VI.-5.IX.35, 13 ex.; Maragi, 26.VIII.35, 1 ex.; Gara, 3.VII.35; Zeitoun, 30.VIII.35, 2 ex.

Distribution : Egypt, Mediterranean region.

Tachys scutellaris var. centromaculatus Wollaston, 1864.

Wollaston, 1864, Cat. Col. Canar., p. 67; Bedel, 1896, Cat. rais. Col. N. Afrique, I, pp. 74 and 78.

Localities : Siwa Depression, 30.VI.35, 12 ex.; 12.VII.35, 3 ex.; Siwa, 2.VI.35-2.IX.35, 53 ex.; Khamissa, 29.VI.35, 46 ex., 5.VIII.35, 2 ex.; Maragi, 24.VI.35, 15 ex., 26.VIII.35, 10 ex.; Tenterad, 26.VII.35, 12 ex.; Zeitoun, 30.VIII.35, 2 ex.

Distribution : Canary Is., Morocco, Algeria, Tunisia. The typical form occurs in Europe. Is found on salt mud at the edge of lakes.

Anthia sexmaculata Fabricius var. marginata Latreille, 1827.

Latreille, 1827, Descr. d'Ins. d'Afrique recueillis par Cailliaud, p. 3; Voy. Caillaud IV, p. 273.

Localities : Siwa, 15.VII.35, 6 examples; Zeitoun, 2.IX.35, 1 example; Khamissa, 29.VI.35, 1 example, 3.IX.35, 1 example; Lake Shiata, 2.VIII.35.

Distribution : Egypt, Sudan. The typicacl form occurs in Egypt, Tripoli. Tunis, Algeria and Syria.

Feronia (subg. Orthomus) barbarus Dejean, 1828.

Dejean, 1828, Spec. Gén. Col., III, p. 261; Bedel, 1899, Cat. rais. Col. N. Afrique, I, pp. 182 and 192.

Localities : Siwa, 14.IV.35, 2 examples.

Distribution : S. Europe, N. Africa, Canary Is, Palestine (G.R. Crotch), Syria (Warren).

Masoreus wetterhalli Gyllenhal var. aegyptiaccus Dejean, 1828.

Dejean, 1828, Spec. Gén. Col., III, p. 538; Bedel, 1904, Cat. rais. Col. N. Afrique, I, pp. 227-228.

Locality : Siwa, 14.IV.35, 2 examples.

Distribution : Egypt, Algeria, Sicily, Spain.

Dromius henoni Bedel, 1907.

Bedel, 1907, Cat. rais. Col. N. Afrique, I, p. 277.
Locality : Siwa, 22.VIII.35, 2 examples.
Distribution : Lower Egypt.

Pheropsophus africanus (Dejean, 1825).

Dejean, 1825, Spec. Gen. Col., I, p. 303; Bedel, 1914, Cat. rais. Col. N. Afrique, I, p. 309.

Localities : Siwa, 10.VII.35, 17 ex., 16.VII.35, 2 ex., 4.VIII.35, 1 ex., 6.IX.35, 1 ex., 10.IX.35, 1 ex.; Khamissa, 27.VI.35, 2 ex., 28.VIII.35, 2 ex.

Distribution : North Africa, Sinai, Tadjura, Abyssinia (Adua), Yemen.

RESULTS OF THE ARMSTRONG COLLEGE EXPEDITION TO SIWA OASIS (LIBYAN DESERT), 1935

A Second List of the Formicidae

[Hymenoptera]

by Horace Donisthorpe, F.Z.S., F.R.E.S., etc.,
Department of Entomology, British Museum (Natural History).

Since my former paper (*Ann. Mag. Nat. Hist.*, s. II, 9, 26-33, 1942) on the ants of the Siwa Oasis, a second lot of specimens collected by Omer-Cooper has reached me. There are no additional species of ants in this lot; but the female of a *Solenopsis* (No. 15 of the former list) enables this species to be named. It proves to be a new species which I have described below.

The following species comprise the present list (the numbers used are those of the former paper).

3. *Messor barbarus* L. subsp. *aegyptiaca* Emery.
1 ☿, El Arig, 8.VI.35.

5. *Pheidole (Pheidole) pallidula* Nyl. var *reticeps* Forel.
1 ♂, Siwa, 12.V.35; 1 ♂, *ditto*, 29.IV-1.V.35; 1 winged ♀, 27.IV.35; winged ♀♀, 27-28.IV.35.

7. *Cardiocondyla emeryi* Forel subsp. *mahdii* Karawajew.
☿☿, Siwa, in moth trap, 29.IV., 4.V., 12.V., and 17.V.35; 1 ☿, Zegawa, 13.V.35.

8. *Cardiocondyla nuda* Mayr var. *mauritanica* Forel.
1 ☿, Siwa (gardens), 18-19.IV.35; ☿☿, Zegawa, 1.V., and 12.VI.35.

9. *Crematogaster (Acrocoelia) auberti* Emery var. *oasium* Santschi.
17 ☿☿, Baharein, 11 and 12.VI.35; El Arig, 8.VI.35; Sitra, 14.VI.35.

10. *Monomorium (Xeromyrmex) bicolor* Emery.
1 ☿, Zegawa, 18.V.35; 15 ☿☿, Siwa, 27.IV.35.

11. *Monomorium (Xeromyrmex) salomonis* L.
☿☿, Siwa (gardens), 18-19.IV, and 1.VI.35.

14. *Monomorium* (*Lampromyrmex*) *atomus* Forel subsp. *cospeis* Donisthorpe 1 ☿, 3-5.V.35.

15. Solenopsis cooperi spec. nov.

♀. — Head, thoras and pede light brownish yellow, antennae, legs, and gaster pale yellow, eyes and teeth of mandibles black; whole smooth and shining, furnished with short scattered yellow outstanding hairs.

Head longer than broad, slightly broader anteriorly than posteriorly, posterior angles rounded, posterior border slightly and evenly excised, dorsal surface with some small scattered punctures, and a round shallow fovea or puncture on disc; *mandibles* powerful, faintly longitudinally striate, outer border rounded, inner border straight, masticatory border armed with 3 teeth, two sharp ones at apex, the apical one being the longer, and one blunt tooth at base; dorsal surface of *clypeus* convex, anterior border sinuate on each side, and armed in centre with two small blunt teeth; *frontal carinae* not long, narrow, raised, rather wide apart, and slightly divergent behind; *eyes* large, round, slightly convex, consisting of a number of facets, and situated in front of middle of sides of head; *ocelli* moderate; *antennae* 11-jointed, *scape* curved, not reaching posterior ocelli, *funiculus* with first joint longer than broad, longer than the following seven joints, which are transverse, last two joints large, elongate, forming a two-jointed club, the last joint of which is pointed and longer than the preceding. *Thorax* narrow, considerably longer than broad; *pronotum* transverse, short, furnished with a neck anteriorly; *mesonotum* higher than pronotum, which it slightly overlaps, longer than rest of thorax, narrowed and rounded anteriorly, *scutum* of mesonotum with a few small scattered punctures, slightly convex; *scutellum* round oval, rather flat on disc; *metanotum* narrow, transverse, lower than scutellum and epinotum; *epinotum* sloping, narrowed behind, no marked angle between dorsal surface and declivity. *Petiole* and *post-petiole* with dorsal surfaces subequal, convex, rounded above and at sides; *gaster* long, voluminous, narrowed in front and behind, truncate at base. *Legs* moderate. *Wings* transparent, veins and pterostigma pale yellow, one discoidal and one cubital cell present, radial cell open. *Long*. 4.8 mm.

♂. — Brown, smooth and shining, mandibles, antennae and legs pale yellow. Body furnished with short yellow outstanding hairs. *Head* small, triangular, posterior angles rounded, posterior border truncate; *mandibles* narrow, masticatory border armed with three teeth; *clypeus* convex; *frontal carinae* short, divergent, not close together; *frontal furrow* in the form of a rather deep small fovea; *eyes* kidney-shaped, very large and prominent, situated on front of sides of head; *ocelli* large, situated on top of posterior part of head; *antennae* 12-jointed, *scape* a little longer than first joint of funiculus,

funiculus with first joint globose. *Thorax* narrow, longer than broad, narrowed in front and behind, construction similar to that of ♀. *Petiole* with upper surface slightly excised; *post petiole* broader than petiole, rounded above and at sides; *gaster* short oval, truncate at base; *cerci* present. *Legs* rather long. *Wings* as in ♀. *Long.* 3.3 mm.

Type and ♂ type in British Museum Collection.

Described from 8 winged females and 5 males, taken by J. Omer-Cooper.

Egypt : Siwa, 15 and 24.V.1935.

This is the *Solenopsis* sp. of my former paper, No. 15. Over one hundred and seventy ♂♂ from Egypt (Siwa), 21.VIII.35 (J. Omer-Cooper).

17. *Plagiolepis pallescens* Forel subsp. *maura* Santschi var. *sordida* Santschi.

1 ☿, Siwa (gardens), 18-19.IV.35; 2 ☿☿, 29.IV.-1.V.35, Siwa (in moth trap).

19. *Acantholepis frauenfeldi* Mayr var. *variabilis* Santschi.

1 ☿, Baharein, 9-10.VI.35.

21. *Camponotus* (*Tanaemyrmex*) *maculatus* F. subsp. *aegyptiaca* Emery.

Many ☿☿, ♃♃, winged ♀♀, ♂♂, 22nd, 26th, 27th, 29th.IV.35, Siwa; *ditto*, Siwa depression, Koreshid, Zeitoun, and Abu Sharuf; 1 ♂, Siwa (in moth trap), 23.V.35.

23. *Camponotus* (*Orthonotomyrmex*) *sericeus* F.

Many ☿☿ and ♃♃, Siwa, Siwa depression, Tutuata; Ultaba Tarmarabas, 18.IV., 4.V., 13.V., 28.V.35.

24. *Paratrechina* (*Nylanderia*) *jaegerskjoeldi* Mayr var. *borcardi* Santschi.

1 ♂, Siwa (in moth trap), 29.IV.-1.V.35; Siwa, 2 winged ♀♀, 11 and 17.VI.35.

26. *Cataglyphis* (*Cataglyphis*) *bicolor* F.

Numerous ☿☿, 4 winged ♀♀, 1 ♂, Siwa, Siwa depression, Tutuatee, Bahrein, Koreshid, Zeitoun, and Abu Scharuf, 29.IV., 13 and 18.V., 9-10.VI.35.

27. *Cataglyphis* (*Machaeromyrma*) *bombycina* Roger.

12 ☿☿, El Arig, 8.V.35; 84 ☿☿, ditto, 18.VI.35; 2 ☿☿ Gabel Khamissa, 4-6.V.35.

RESULTS OF THE ARMSTRONG COLLEGE EXPEDITION TO SIWA OASIS (LIBYAN DESERT), 1935

Diptera *Tabanidae, Asilidae, Therevidae,* and *Bombyliidae*

by H. Oldroyd, M.A., F.R.E.S.,
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Under the leadership of Mr. J. Omer-Cooper the Armstrong College Expedition brought back a very large collection of Diptera from the Siwa Oasis. The task of sorting, mounting and labelling this collection was well advanced when the outbreak of war brought about an interruption of several years. The material is now available for study.

Mr. Omer-Cooper has made a diligent collection of the smaller Diptera, which are so often neglected by Expeditions. Unfortunately, owing to arrears of work resulting from the war, and to the death or departure of members of the Museum staff, it will not be possible to undertake reports upon the bulk of this material for some time to come. For the present the most that can be offered is a report on a few families of the larger Brachycera.

The four families discussed are represented in this collection by ten genera and seventeen species, all of which are already recorded from Egypt. Although there are no new species, several were not previously represented in the British Museum collection, and the long series obtained by Mr. Omer-Cooper are very welcome. One species of *Tabanus* is questionably identified as *aegyptiacus* Kröber, of which only one specimen was previously known.

In naming these Diptera I have made extensive use of the « Monograph of Egyptian Diptera » by H. C. Efflatoun Bey (*Mém. Soc. roy. ent. Egypte*, 1930-34), a comprehensive and excellent work to which I wish to make due acknowledgment. I differ from Efflatoun on two points, one regarding the use of the name *Satanas* and the second concerning the identity of the species which he records as *Stiphrolamyra diacantha* Hermann.

Bull. Soc. Fouad Ier Entom., XXXI, 1947. [113].

TABANIDAE

PANGONIIAE

There are no species of this sub-family in the present collection.

TABANINAE

Haematopota

Meigen, 1803, Ill. Mag., II, p. 267.
Genotype : *Tabanus pluvialis* Linn., monotypic.

Haematopota minuscula

Haematopota minuscula Austen, 1920, *Bull. Ent. Res.*, X, p. 287.
Chrysozona siwayensis Kröber, 1929, *Bull. Soc. Roy. Ent. Egypte*, p. 83.

Locality : Koreischid, 30.VI, 11 ♀♀ ; *ibid*, 17.V, 1 ♀ ; Sitra, 14.VI, 12 ♀♀ ; El Arig, 7.VI, 5 ♀♀ ; Baharein, 11.VI, 5 ♀♀ ; Siwa, 7.IX, 1 ♀ ; Khamissa, 4.V and 2.VI, 3 ♀♀ ; Jagub, 17.VIII, 3 ♀♀.

Described from one female from Palestine, this species is otherwise known exclusively from the Siwa area of Egypt. The male is not known.*

Tabanus

Linnaeus, 1758, Syst. Nat., Ed. X, p. 601.

Genotype : *T. bovinus* L., by designation of Latreille, 1810, Consid. Gén., p. 443.

Tabanus taeniola

Tabanus taeniola Palissot de Beauvois, 1805-21, Ins. Recueil. en Afr. et en Amér., p. 56.

Locality : Siwa, 23.V, 27.V, 2.VI, 1 ♂, 2 ♀♀.

A large and conspicuous species, widely distributed in Africa, and one of the few genuinely Ethiopian species in this collection. It is well known in the Sudan, where it is believed to be one of the most active transmitters of camel trypanosomiasis.

Tabanus separatus

Tabanus separatus Efflatoun, 1930, *Mém. Soc. Roy. Ent. Egypte*, IV, p. 89.

Locality : Sitra, 13-16.VI, 58 ♀♀ ; Siwa, 8.V, 1 ♀ ; Baharein, 10-12.VI, 6 ♀♀ ; El Arig, 7.VI, 41 ♀♀.

A small grey species, very closely allied to *T. albifacies* Lw. from which it can be separated by the much larger upper callus of the female. Efflatoun records it from Siwa as well as from the Red Sea coast.

Tabanus (Ochrops) pulchellus

Tabanus pulchellus Loew, 1858, *Verh. zool.-bot. Ges. Wien*, VIII, p. 597.
Tabanus cyprianus Ricardo, 1911, *Rec. ind. Mus.*, IV, p. 6.

Locality : El Arig, 7.VI, 23 ♀♀ ; Siwa, 4.VI, 29.VIII, 2 ♀♀ ; Baharein, 10-11.VI, 2 ♀♀ ; Jagub, 17.VIII, 2 ♀♀ ; Khamissa, 29.VI, 1 ♀ ; Ilrhabit, 18.V, 1 ♀.

This and the following species belong to the subgenus *Ochrops* Szilády, which, as subgenera of *Tabanus* go, is comparatively well defined. They are tawny forms, abdomen, wings and head having a marked yellowish tinge. In addition the yellow eyes, more hemispherical than in other Tabanids, are a conspicuous feature.

T. (O.) pulchellus is a common and fairly widely distributed Egyptian species which also extends into Asia Minor, Persia and Cyprus. It is distinguished from the following species most easily by the parallel-sided frons, darker thorax and abdomen, and by the wing-veins which are yellow in the basal half of the wing and blackish on the apical half. Efflatoun considers it may be associated with camel trypanosomiasis.

Tabanus (Ochrops) ? aegyptiacus

Tabanus aegyptiacus Kröber, 1926, *Bull. Soc. Roy. Ent. Egypte* (1925), p. 235.

Locality : El Arig, 7-8.VI, 15 ♀♀ ; Baharein, 9-10.VI, 13 ♀♀ ; Sitra, 14.VI, 6 ♀♀ ; Jagub, 17.VIII, 1 ♀ ; Siwa, 2.VI ; 3 ♀♀ and 1 ♂.

T. aegyptiacus Kröber was described from two females from Mariout and Cleopatra (Ramleh). Efflatoun (1930, p. 51) decided that these two females were not conspecific, and declared one of them to be a variety of *farinosus*, leaving *aegyptiacus* represented only by the single type female.

The present series, though thirty-nine in number, are so poorly preserved that it is difficult to be sure of their identity. I relate them provisionally to *aegyptiacus* because the abdomen is without markings — except irregular darkish patches in denuded specimens — and the shape of the frons agrees with Efflatoun's figure. I would not say, however, that the head is abnormally narrow, as he states for *aegyptiacus*, and there are minor colour differences, including practically no black hairs on the head or antennae, frontal calli reddish brown, not blackish, and knobs of halteres pale yellow. There are no tufts of black hairs laterally on the abdomen, as in the second of Kröber's specimens.

ASILIDAE

DASYPOGONINAE

Saropogon

Loew, 1847, Linnaea Ent., II, p. 439.

Genotype : *Dasypogon luctuosus* Meig. by designation of Coquillet, 1910.

Saropogon vestitus

Dasypogon vestitus Wiedemann, 1828, Auss. Zweifl.. Ins., I, p. 406.

Locality : Siwa, 1.V, 15.VII, 24.VII, 4 ♀♀; El Arig, 18.VI, 2 ♀♀ (one newly-emerged and teneral, but appears to belong to this species).

A common Egyptian species, found also in Algeria, Syria, Persia and Baluchistan. It is remarkable for the fact that females only are known, and no male has yet been associated with them. The July captures at Siwa are distinctly outside the range given by Efflatoun (p. 412), whose dates are 7.IV to 3.VI.

Saropogon jugulum

Dasypogon jugulum Loew, 1847, Linnaea Ent., II, p. 441.

Locality : Siwa, 24.VII, 1 ♂; Tutnatee, 25.VI, 1 ♂.

Another species of which one sex only is common in Egypt, in this case the male. Efflatoun records one female from Sinai which might be assigned to this species, and suggests that the female may be active at a different time of day from the male. Loew's original specimens came from the Island of Rhodes and he describes both sexes, referring to « several females », so clearly he did not find an abnormal sex ratio. Again the Siwa record is much later than the date (20.VI) quoted by Efflatoun.

Saropogon elbaiensis

Saropogon elbaiensis Efflatoun, 1937, *Mém. Soc. Roy. Ent. Egypte*, IV, p. 394.

Locality : Baharein, 10.VI, 1 ♂.

This species is easily distinguished by the profile of the face, which is hollowed below the antennae instead of being convex as in the other Egyptian species. Efflatoun records it only from the type-locality, Gebel Elba, near the Red Sea coast in late April and May.

Stichopogon

Loew, 1847, Linnaea Ent., II, p. 499

Genotype : *Dasypogon elegantulus* Meigen by designation of Back, 1909, *Trans. amer. ent. Soc.*, XXXV, p. 332.

Stichopogon chrysostoma

Stichopogon chrysostoma Schiner, 1867, *Verh. Zool.-Bot. Ges. Wien*, XXVII, p. 364.

Locality : Siwa, 16.VII, 1 ♂; Khamissa, 28.VII, 2 ♂♂, 2 ♀♀.

According to Efflatoun, probably the commonest Egyptian asilid. distributed throughout the country, and taken from early March to late

October. Small, usually grey, inconspicuous flies, with a strikingly broad frons hollowed out between the eyes, species of *Stichopogon* are found on dry pebbles in a stream bed, or on patches of hot, dry sand on the seashore.

LAPHRIINAE

Stiphrolamyra

Hermann in Engel, 1930, Flieg. pal. Reg., XXIV, p. 231.
Genotype : *Lamyra bipunctata* Loew, by original designation.

Stiphrolamyra rubicunda nom. nov.

Stiphrolamyra diaxantha Efflatoun, 1934, *Mém. Soc. Roy. Ent. Egypte*, IV, p. 179; Engel, 1925, *Bull. Soc. Roy. Ent. Egypte* (1924), p. 354 et 1930, in Lindner, Flieg. pal. Reg., XXIV, p. 232 *p.p. nec* Hermann, 1907, Zeit. Syst. Hymen. Dipt., VII, p. 72.

Locality : Siwa, 31.VII, 1 ♂; Lake Shiata, 2.VIII, 1 ♀; Khamissa, 12.VIII, 1 ♀.

These specimens agree perfectly with the long and excellent description given by Efflatoun for what he records as *S. diaxantha* Hermann, a species originally described from German West Africa. I have in the British Museum a male and a female of the true *diaxantha* from Willowmore (Dr. Brauns), labelled in Hermann's handwriting, and there is no doubt that this is not the Egyptian species. There are a number of discrepancies between Hermann's description and Efflatoun's, which I tabulate below, and in every instance the Willowmore specimens agree with Hermann's description and the Egyptian specimens with Efflatoun's.

DISTINCTIVE CHARACTERS	HERMANN	EFFLATOUN
Size..........	14 mm.	18-26 mm.
Face..........	Hardly prominent.	Distinctly prominent.
Palpi	Black, hairs white at base of palp, black at its tip	Orange, with yellowish hairs.
Antennæ (third segment).. ..	Very short and clavate, little longer than broad.	More elongate as figured by Efflatoun.
Thoracic bristles	Mixed black and white, long bristles all black!	White and rusty read, long bristles rusty red.
Scutellum.... .	Black, long black bristles.	Yellow to brownish red, no marginal bristles.
Abdomen (lateral bristles) ...	Strong, black.	Weak, white or yellowish.
Legs..........	Dark brown, bristles red.	Orange, bristles pale.

Engel's description (1930) is clearly drawn up from his S. African specimens, which are part of the same material as those in the British Museum. His sole Palaearctic record is a specimen froh Marj, Egypt, which he recorded in 1925 as « larger than the type, but agrees entirely with it ». Efflatoun includes this same Marj specimen in his records, so presumably it must be the normal Egyptian form. From the material before me I can only conclude that Engel was wrong in regarding this specimen as conspecific with *diaxantha* Hermann.

The Egyptian species is rather like *S. comans* Hobby, of which I have the type before me, but it entirely lacks the conspicuous « brush » of thick white hairs on the pro- and sternopleura.

Efflatoun records this species from the neighbourhood of Cairo, the Red Sea Coast, and Sinai : « A very large robust, shining reddish yellow and black fly, one of our most ditinct species ». A powerful flier, and a hunter of large prey, including dragonflies and the larger sarcophagids.

ASILINAE

Satanas

Jacobson, 1901, Guide Museum St. Petersburg, p. 259.
Genotype : *Asilus gigas* Eversmann, by original designation.

Satanas gigas

Asilus gigas Eversmann, 1854, *Bull. Soc. Imp. Nat. Moscou,* XXVII, p. 200.

Locality : Siwa, 25.V, 29.V, 4.VI, 2 ♂♂, 3 ♀♀ ; Ilrabit, 18.V, 2 ♂♂, 3 ♀♀ ; Sitra, 14.VI, 5 ♂♂, 3 ♀♀ ; Maragi, 29.VI, 1 ♀ ; Khamissa, 22.VI, 2 ♂♂, 2 ♀♀ ; Baharein, 12.VI, 2 ♀♀.

A fine series of this very striking species, which is one of the largest known Diptera.

Besides its size, this species is remarkable for its venation — R_5 curved forward to reach the margin before the wingtip, and the branches of M often faded — and for the long, tubular spiny ovipositor of the female. It was placed by Loew in the genus *Proctacanthus* Macq., but Jacobson erected his new genus for it because the ovipositor, though spiny, lacks the conspicuous circlet of spines to which the name *Proctacanthus* alludes. Engel (1930, Flieg. pal. Reg., XXIV, p. 19) retains the genus *Satanas*, pointing out that in addition to the genital characters the metanotal slopes are hairy in *Satanas* and bare in *Proctacanthus*. Efflatoun (p. 45) returns this species to *Proctacanthus*, but I cannot follow him in that. I fail to understand his reference to hairs on the *humeral calli* of the mesonotum, which he rejects as a generic character. I think he has confused this with the question of hairs on the *metanotum*, a character which is of considerable generic importance in the Asilidae, though not, of course, infallible. I have not seen the other species which Engel includes in *Satanas*, but in the absence of more definite reasons I think the genus should be retained, leaving *Proctacanthus* for the New World and Oriental species.

Apoclea

Macquart, 1828, Dipt. exot., I, p. 119

Genotype : *Asilus algira* Fabr., monotypic (as *pallida* spec. nov., and *fuscana* spec. nov., both synonyms).

Apoclea algira

Asilus algira Fabricius, 1794, Ent. Syst., IV, p. 376.

Locality : Siwa, 27.VI-4.IX, 15 ♂♂, 13 ♀♀; Jagub, 17.VIII, 1 ♂; Lake Shiata, 2.VIII, 1 ♂; Khamissa, 29.VI, 2 ♂♂; Tutnatee, 26.VI, 1 ♀.

The commonest species of a typical N. African genus. There is a further female from El Arig, 7.VI, which has shorter hairs on the scutellum and might be *A femoralis* Wied., but it is damaged and cannot be determined with certainty.

Apoclea micracantha

Apoclea micracantha Loew, 1856, Neue Beitr., IV, p. 42.

Locality : Siwa, 1.V-19.VIII, 2 ♂♂ 2 ♀♀; Khamissa, 29.VI, 4 ♂♂, 1 ♀; Baharein, 17.VI, 1 ♂.

THEREVIDAE

Psilocephala

Zetterstedt, 1838, Ins. Lapp., p. 525.

Genotype : *Bibio imberbis* Fallén, by designation of Coquillet, 1910.

Psilocephala frauenfeldi

Thereva frauenfeldi Loew, 1856, Beitr., IV, p. 32.

Locality : Siwa, 31.V-6.VIII, 3 ♂♂, 6 ♀♀.

A bare-looking species of typical Therevid build, ornamented on wings and thorax with brown stripes in a sort of « dazzle-painting ». It appears, not very commonly, in collections from the N. African sub-region.

BOMBYLIIDAE

HOMEOPHTHALMAE

Geron

Meigen, 1820, Syst. Beschreib., II, p. 223

Genotype : *Bombylius gibbosus* Oliv., monotypic as *hybridus* Mg. + *halteralis* Wd.

Geron gibbosus

Bombylius gibbosus Olivier, 1789, Encyclop. Méthod., IV, p. 329.
Bombylius hybridus Meigen, 1804, Klass. Zweifl. Ins., I, p. 186.

Locality : Siwa, 18-19.IV, 9.VIII-8.IX, 10 ♂♂, 24 ♀♀ : Maragi, 14.VIII, 1 ♀ ; Gara, 4.VII, 1 ♂.

TOMOPHTHALMAE

Anthrax

Scopoli, 1763, Ent. Carn., p. 358.

Genotype : *Musca anthrax* Schrank, monotypic as *A. morio* Scop., *nec* Linn.

Spongostylum Macquart, 1840, Dipt. exot., II(1), p. 53.

Genotype : *mystaceum* Macq., monotypic.

Argyramoeba Schiner, 1860, *Wien. Ent. Monatschr.*, IV, p. 51.

Genotype : *Anthrax tripunctata* Wd., by designation of Coquillet, 1910.

Anthrax (Argyramoeba) leucogaster

Anthrax leucogaster Wiedemann *apud* Meigen, 1820, Syst. Beschreib., p. 163.

Locality : Siwa, 7-31.VII, 3 ♀♀ ; Sitra, 15.VI, 1 ♀.

Anthrax (Spongostylum) ocyale

Anthrax ocyale Wiedemann, 1828, Auss. Zweifl. Ins., I, p. 285.

Locality : Siwa, 2.VI to 25.VII, 10 ♀♀ ; Gara, 4-5.VIII, 1 ♀ ; Sitra, 15.VI, 1 ♀ ; Maragi, 26.VI, 1 ♀ ; Baharein 10.VI, 1 ♀.

In addition to these there are 28 specimens of clear-winged *Anthrax* and *Villa* which are so denuded that they cannot be identified. They include, I think, one female of *Villa circumdata* Lw., and a very small female of *Anthrax isis* Meig.

RESULTS OF THE ARMSTRONG COLLEGE EXPEDITION TO SIWA OASIS (LIBYAN DESERT), 1935

Scorpiones

[Arachnida]

by R. J. Whittick, B.Sc.,
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All the scorpions collected by the Siwa Expedition belong to the family Buthidae and most of the specimens are referable to one, common, North African species, *Buthus acutecarinatus*. The remainder fall into four other well-known species which are widely distributed in North and East Africa. In the following account, references are given to the literature published since 1899, and for earlier literature the monograph by Kraepelin (1899) should be consulted.

Family BUTHIDAE

Sternum triangular, tapering anteriorly; terminal tarsal joint bearing both an outer and an inner basal spine; lateral eyes 3-5 on each side.

Genus BUTHUS Leach 1815.

Immovable cheliceral finger with two teeth on the lower edge; prosoma and mesosoma dorsally with distinct granulose keels; legs 3 and 4 with tarsal spurs; oblique granular rows of the pedipalpal finger with 1 or 2 lateral basal granules; middle lamella of pectines not dilated at the base; metasoma with distinct ventral keels on all segments; spine under the sting absent or reduced to a blunt tubercle.

1. Buthus (Prionurus) australis (L.) 1758 amoreuxi (Aud. ex Sav.) 1826.
B. australis var. *citrina* (H. and E.) of some authors.

Audouin 1826, p. 173, pl. 8, fig. 2; Birula 1903, p. 110, and 1908, p. 134; Simon 1910, p. 66; Werner 1911, p. 184; Hirst 1911, p. 217; Borelli 1914, p. 153, and 1915, p. 457; King 1925, p. 81; Birula

1927, p. 80; Borelli 1927, p. 348; Seurat 1930, p. 346; Schenkel 1932, p. 378; Caporiacco 1932, p. 397, 1936, p. 98, and 1937, p. 342.

Material : 3 adults (1935); 3 adults (22 April 1935); 1 adult (18-20 April 1935).

Large scorpions up to about 12.5 cm. in length and bright yellow in colour. Fifth metasomal segment of adult with prominent, lateral, dorsal keels, limiting a concave dorsal surface; sternite of seventh mesosomal segment with 4 distinctly granular keels; second and third metasomal segments with only 8 complete keels, the accessory keels in the former confined to the posterior 1/3 and in the latter, reduced to a few granules; the pedipalpal chelae about 6 mm. in diameter.

Distribution : Sudan and Egypt (Nile Valley), Giarabub, Cufra, and Gialo (oases in the Libyan Desert), Fezzan, Southern Tunisia and Algeria.

Collector's Notes : Was not found in the oasis; lives in the sand dunes which lie to the south of Siwa and form the southern boundary of the Siwa Depression.

2. Buthus (Buthacus) leptochelys (H. and E.) 1828.

Hemprich and Ehrenberg 1828, Scorp., nos. 3, 4 and 5.

Birula 1908, p. 139; Simon 1910, p. 75; Werner 1911, p. 185; Borelli 1914, p. 158; Birula 1927, p. 81; Borelli 1927, p. 352; Schenkel 1932, p. 379; Caporiacco 1932, p. 396, 1936, p. 98, and 1937, p. 347.

Material : 1 adult (27 August 1935).

A medium sized scorpion about 6.5 cm. long and pale yellow in colour. Fifth metasomal segment without dorsal keels, the dorsal surface smooth and convex, the ventro-lateral keels with lobiform teeth posteriorly; front of prosoma smooth; supraciliary ridges smooth and keels of the prosoma obsolete; vesicle smooth.

Distribution : North Africa from Eastern Algeria and Tunisia to Egypt; Arabia.

Collector's Notes : Found in rocky desert a few miles north of Siwa and close to the Musa Matruh road.

3. Buthus (Buthus) quinquestriatus (H. and E.) 1828.

Hemprich and Ehrenberg 1828, Scorp., no. 1.

Birula 1908, p. 124; Tullgren 1909, p. 3; Simon 1910, p. 70; Werner 1911, p. 184; Hirst 1911, p. 218; Borelli 1915, p. 461; King 1925, p. 82; Birula 1927, p. 79; Borelli 1927, p. 351, and

1929, p. 297; Schenkel 1932, p. 380; Caporiacco 1932, p. 396; 1936, p. 98, and 1937, p. 346.

Material : 1 adult, desert at Gagub (19 August 1935); 1 adult (21 August 1935).

A medium sized scorpion about 6 cm. long, pale yellow in colour generally but with the fifth metasomal segment darker. Fifth metasomal segment without dorsal keels, the dorsal surface smooth and convex; front of prosoma granular; posterior median keels of prosoma confluent with the median keels to form a lyre-shaped figure; middle median keels joined to form an H-shaped figure; first three mesosomal tergites 5-keeled; ventral median keels of all caudal segments evenly serrate, without enlarged teeth.

Distribution : North Africa from Algria to Egypt; Sinai; Syria and Palestine; Arabia.

Collector's Notes : (19 August 1935). In rocky desert close to the oases Gagub *circa* Lat. 29°40' N, Long. 25°0' E.

4. Buthus (Buthus) acutecarinatus E. Simon, 1883.

Simon 1883, p. 245; Birula 1908, p. 129; Tullgren 1909, p. 2; Birula 1909 b, p. 511; Simon 1910, p. 73; Werner 1911, p. 185; Hirst 1911, p. 217; Borelli 1915, p. 458, and 1924, p. 7; King 1925, p. 82; Birula 1927, p. 80; Borelli 1927, p. 351, and 1929, p. 297.

Material : 120 adults (18-20 April 1935); 9 adults (18 April 1935); 4 adults (30 August 1935).

Small yellowish-brown scorpions up to about 3.5 cm. in length. Dorsolateral keels of the fifth metasomal segment granular, confined to the anterior half of the segment; the dorsal surface convex and the ventral median and lateral keels evenly granular; front of prosoma granular; supraciliary ridges distinctly granular; posterior median keels of prosoma confluent with the middle median keels to form a parallel-sided figure; mesosomal tergites all with three straight smooth keels.

Distribution : From Cirenaica to Arabia, including Syria, Eritrea and Abyssinia; extending up the Nile Valley to the Uganda border.

Collector's Notes : An oasis species occurring both at Siwa and Khamissa but none were seen in the desert. The gardens are its chief habitat and it appears to be more abundant in the spring than during the heat of summer.

Genus ORTHOCHIRUS Karsch 1891.

Immovable cheliceral finger with two teeth on the lower edge; prosoma with deep transverse grooves behind the ocular tubercle; legs 3 and 4 with tarsal spurs; oblique granular rows of the pedipalpal finger with 1 or 2 lateral basal granules; prosoma in front of the median eyes slopes steeply to the anterior edge; metasoma enlarged posteriorly, the fifth segment deeply pitted ventrally, without a median ventral keel.

5. Orthochirus scrobiculosus (Grube) 1873.

O. innesi Simon 1910.

Grube 1873, p. 56; Birula 1908, p. 145, and 1909 a, p. 356; Simon 1910, pp. 78 and 79; Werner 1916, p. 81; Birula 1927, p. 83; Borelli 1927, p. 353.

Material : 18 adults (18-20 April 1935); 1 adult (18 April 1935).

Small scorpions up to about 3.5 cm. in length. The body is black with the legs and pedipalpi brown proximally and yellow distally. Terminal metasomal segments coarsely pitted on lateral and ventral surfaces; coxae 2 thickly granular and coxae 4 bordered by 3 or 4 triangular, parallel rows of granules; dorsal surface of metasoma with only a few granules in the anterior segments, the posterior edges of III and IV quite smooth; prosoma anterior to the ocular tubercle granular; mesosomal tergites with a single median keel; dorsal keels of metasoma granular.

Distribution : After comparing the above material with specimens from Sudan, Egypt, Palestine and Mesopotamia, I agree with Birula (1927) that *O. innesi* Simon and *O. aristidis* Simon cannot be regarded as specifically distinct from each other or from *O. scrobiculosus* (Grube). Borelli (1927) reports its presence (under the name *O. innesi*) at Giarabub and Porto Bardia (Cirenaica) and the species has therefore a wide range in regions south and east of the Mediterranean and in Central Asia (Persia and Transcaspia).

Collector's Notes : An inhabitant of the oases; does not occur in the desert.

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RESULTS OF THE ARMSTRONG COLLEGE EXPEDITION
TO SIWA OASIS (LIBYAN DESERT), 1935

Pseudoscorpionidea

[Arachnida]

by M. Beier, Vienna.

The material contains only a single species, *Rhacochelifer similis* Beier (*Ann. Mus. Genova*, LV, 1832, pp. 488-489, figs. 1 and 2).

Siwa (Siuah) Oasis, Egypt, from *Tamarix*, 26 April 1935, M. Cameron, 5 ♂♂, 5 ♀♀ (Brit. Mus., 1936.2.12, 1081-1091) and 2 ♂♂, 1 ♀, from the same locality, 10 August 1935 (Brit. Mus., 1936.2.12, 1078-1080).

A relatively small species, which can be characterized as follows :

Carapax distinctly longer than broad, finely and densely granulated, with two, rather deep, transverse furrows, the basal one localized nearer to the hind margin than to the anterior furrow. Tergites divided, with 5 marginal setae on each half tergite. The bristles dentated but not clavated. Flagellum with 3 setae. Serrula with 19 teeth. Palps pretty strong, distinctly granulated, the medial side of femur and tibia without greater granules. Femur 3.1 times, tibia 2.3 to 2.4 times, claw 2.8 to 2.9 times as long as broad. Fingers distinctly shorter than the hand without the stalk. The trichobothrium *it* localized distally from *ist*. Fore legs of the male relatively slender, the tibia 3 times and the tarsus 2.9 times as long as broad, the latter with margins nearly straight, distally moderately dilated, apically obliquely cut. The claws asymmetrical, without a secondary tooth. Subterminal seta toothed distally.

Length of body, ♂, 1.6-2 mm., and ♀, 2-2.5 mm.; Palps : femur, length 0.65-0.67 mm., breadth 0.20-0.21 mm.; tibia, length 0.55-0.58 mm., breadth 0.23-0.25 mm.; hand, length 0.62-0.65 mm., breadth 0.32-0.34 mm.; fingers, length 0.45-0.48 mm.

The species has been described from the Gialo (Djalo) Oasis, Cirenaica, and is now recorded from the Siwa (Siuah) Oasis, Egypt. There is no doubt that the species can be found also in the other Oases of the Libyan desert. It lives under the bark of Tamarisks and other trees.

The species is related to *R. disjunctus* (L. Koch) and *pinicola* (Nonidez), both from South-Western Europe, but differs from the first one in the smaller body, the localization of the trichobothrium *it* and in the much more slender fore legs of the male; from the latter especially in the more slender palps. It seems to be a species endemic to the Oases of the Libyan desert.

Biology of *Gynaikothrips ficorum* Marsh. in Palestine

[Thysanoptera]

(with 3 Figures and 3 Tables)

by Dr. E. Rivnay,
Agricultural Research Station (Rehovoth, Palestine)

FOREWORD

Gynaikothrips ficorum Marsh. the origin of which is probably South-Eastern Asia is comparatively new in Palestine, having first been discovered on a group of *Ficus nitida* trees in the main streets of Rehovoth late in 1943. A short while later it was discovered on the Experimental Station grounds, and in the year 1944 it was reported from other remote sections of the country.

In Egypt it appeared about two or three years earlier than in Palestine; it reached the Mediterranean Region apparently early this Century. The writer is of the opinion that the insect was introduced here during the war by the aeroplanes which arrived here after visits in other countries. The fact that Rehovoth lies in the vicinity of three airfields may possibly explain why the insect was first found here.

A description of this *Gynaikothrips* is given by George Morcos (1944) and by del Canizo (1944). These papers are accompanied by drawings and there is no need for repeating the description now. However, since a study of the biology of this pest is not yet available, it is presented herewith.

DAMAGE

Gynaikothrips ficorum attacks the ornamental tree *Ficus nitida*. The injury consists of the folding of the leaves into pod-like pockets in which the female lays her eggs, and in which the development of the offspring takes place. These folds give the tree an abnormal appearance, especially when many leaves are attacked.

METHODS OF STUDY

The writer studied this insect ever since it made its first appearance in Palestine, about four years ago. In spite of many attempts he was unable to breed it in the laboratory for the period of its entire life cycle. The usual methods of brelding Thrips on a cut twig or a leaf in a test tube or cage could not be applied here.

Unlike *Heliothrips* or *Retithrips*, which the writer bred successfully on cut leaves, *Gynaikothrips* does not breed on open leaves. Nor, when two leaves are fastened together do the Thrips remain in the space between them. The adult attacks very young leaves which fold over it. In view of the fact that a cut leaf or even a potted plant will not grow rapidly enough to make a fold, the study of the biology was primarily conducted outdoors on infested trees.

In order to ascertain the length of the incubation period, freshly folded leaves, harbouring one female prior to its laying, were isolated, in a glass tube plugged at both ends with cotton and the date of the first oviposition recorded. By frequent inspections of these leaves, both the length of the incubation period and the length of the period of the development of the larvae could be established. Since pupae and prepupae do not feed, they were isolated in small vials and their development recorded. For the total number of eggs laid by one female, single individuals were isolated before laying, and the number of eggs laid by her recorded. Measurements of the temperature inside the fold were taken with the aid of a thermocouple, and were found to be identical to the temperature outside in the shade.

BIOLOGY OF GYNAIKOTHRIPS FICORUM

Life Cycle

Briefly, the life of the individual Thrips may be described as follows:

A mated female alights on a new leaf of about 10-15 millimetres long. The feeding brings about the folding of the leaf, which encloses the female. A few days later oviposition begins, and continues for almost the entire life of the female. Often another female, or a few others, join her in the folded leaf in order to lay and to feed together.

These facts explain why one may find, upon opening a folded leaf, individuals in all stages — eggs, larvae, pupae and adults of present and previous generations. Moreover, this also explains the presence of so many eggs and individuals of various stages. The young adults remain in the folded leaf a few more days, until they harden, and then emerge in search of other young, soft leaves.

Incubation Period

By the method of isolating females and recording their egg-laying, the incubation period of many eggs was established. In the following data, only the first hatching of the first laid eggs were taken into consideration. The records of these observations are shown in Table I. It is evident from these records that at the low temperature which prevails during the winter in the coastal plain of Palestine, about three weeks are required for the egg to complete its development. In the summer only six to eight days are necessary for the incubation period.

TABLE I

Incubation Period for the Eggs of Gynaikothrips ficorum

NUMBER OF BREEDINGS	PERIOD	NUMBER OF DAYS	AVERAGE TEMPERATURE IN °C
1	October 1945	17	21
5	October 1946	8-14	23.5-25
5	September 1946	6-9	26.5-27.5
1	November 1945	21	18
3	April 1944	16-27	17-18.5

Length of Life of Larvae

The observations on isolated leaves were continued until the first prepupae appeared. In this way the length of life of the larvae was established. In one case ten leaves were isolated, and the eggs of Thrips began to hatch on September 15th-16th, 1946, with the first pupa appearing on the 23rd-24th of that month. Thus, the larval period lasted eight days at a temperature of 26.5° C. Similarly, on ten leaves isolated during October of that year, the larvae hatched between October 14th-16th, and the first pupae appeared on the 25th-27th of the same month. In other words, the larval period lasted from 10-11 days at a temperature of 22.5° C.

Pupal Stages

The prepupal period is very short. At a favourable temperature it lasts about one day or even less than a day. At the temperature prevailing during

January-March, it seldom last longer than three days. The first pupa also completes its development in about 2-4 days during these months. Seldom does it last one day only. The pupal stages last about 3-6 days during March; however, at a low temperature it may take 10 days before it completes development (See Table II).

TABLE II

Length of Development of Pupal stages of Gynaikothrips ficorum

PREPUPA			FIRST PUPA			SECOND PUPA		
NUMBER OF INDIVIDUALS	LENGTH OF DEVELOPMENT IN DAYS	TEMPERATURE IN °C	NUMBER OF INDIVIDUALS	LENGTH OF DEVELOPMENT IN DAYS	TEMPERATURE IN °C	NUMBER OF INDIVIDUALS	LENGTH OF DEVELOPMENT IN DAYS	TEMPERATURE IN °C
4	1	22.2	4	1	22.2	10	3	21
27	2	19-20	13	2	19-20	7	4	19.5-20.6
14	2	21-22	22	3	19-20.5	17	4	21
4	3	19.5	5	4	19.1	2	5	19.4
1	4	19.2	—	—	—	5	6	19.6
						5	10	15.3

Preoviposition Period

As mentioned in an earlier paragraph, the adult Thrips remains in the old fold for some time before leaving in search of a new leaf. In the low temperature of the winter, newly-emerged adults overwinter in the pod and leave it only in the spring. In order to estimate the length of the preoviposition period, newly-emerged females were placed in young, fresh folds from which all other female Thrips had been removed. The length of the preoviposition period could therefore be studied. Several records of such females show that this period lasts about 6-7 days at a temperature of 23° C.

Number of Eggs laid

The maximum number of eggs counted in one pod in which one female was isolated was 125. However, on the average, the number of eggs laid by each female is far less. The average from five females during May, 1944, was 88 per female, while the average from 25 females laid during July-August, 1945, was only 26 eggs per female.

Number of Generations

On several occasions observations on isolated leaves were carried out in order to determine the length of the entire life cycle without recording the duration of the various stages. Table III shows these records.

TABLE III

Length of life-cycle of Gynaikothrips ficorum

NUMBER OF ISOLATED LEAVES	DATE OF FIRST EGGS	DATE OF FIRST ADULTS	LENGTH OF LIFE CYCLE IN DAYS	PREVAILING TEMPERATURE IN °C
3	24. 3 1944	30 4.1944	37	21.5
3	2. 4.1944	4. 5.1944	32	23.1
3	5. 4.1944	7. 5.1944	32	23.0
4	7. 5.1944	5. 6.1944	29	—
1	18. 8.1945	16. 9.1945	29	27.2
10	9. 9.1946	29. 9.1946	20	26.4
4	5.10.1946	30.10.1946	25	23.3

The preoviposition period was not included in the above records. If we add this period, we may estimate the number of generations per year as follows :

Late November, December, January and February ...	1 generation.
March, April and May	2 generations.
June, July and August	3 generations.
September, Otcober and early Novefber	2 generations.

Together this makes about eight generations a year in the coastal plain. In case of an extremely mild winter, one more generation may develop.

PHENOLOGY OF THE THRIPS IN PALESTINE

As mentioned earlier, the thrips feeds and develops upon young leaves only. Consequently a primary factor which brings about a rise in the population of the thrips is the abundance of new leaves. Thus, there is an increase of the activity of the thrips simultaneously with the development of the leaves in the spring. During the winter months — December to February — the thrips manifest very little, if any activity at all. The amount of activity during these months depends upon the weather. In the cold winter of 1944, for instance, the thrips was not active at all, while in the warm winter of 1946-1947, the activity of the thrips continued practically uninterruptedly. Thus in systematic counts, over 4000 live eggs were found on 50 leaves during the month of January 1947.

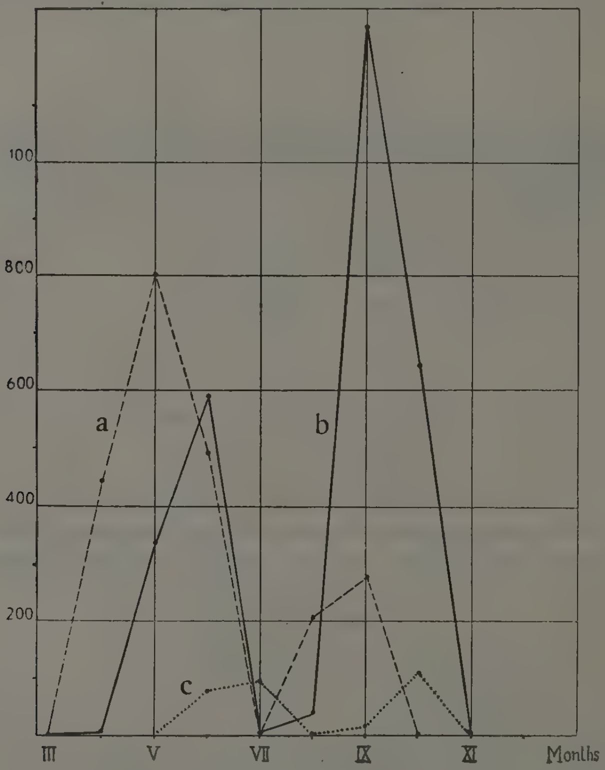

Fig. 1. — Fluctuations in the population of *Gynaikothrips ficorum* in Palestine during 1946 (based on counts in 50 leaves each month).
Line a : eggs; line b : larvae; line c : the predator *Ectemnus*.

Observations on the activity of the thrips during the spring and summer months in Palestine were carried out for four years. However, a true picture could be obtained by systematic counts only. Such counts were carried out during 1945 and 1946. During 1945, the percentage of leaves containing eggs and larvae were recorded, while in the year of 1946, the number of larvae and eggs on 50 leaves was recorded. From these observations and from the counts for 1946 presented in Figure I, the picture of the phenology of the thrips may be summarized as follows :

Throughout March, April and May there is a steady rise in the number of newly-infested leaves, as well as in the number of eggs and larvae. Towards the end of June, July and August there is a considerable decrease in eggs, larvae and newly-infested leaves. Then, late in August, September and October, there is a rise again, which decreases once more in November and December. Naturally the peaks and depressions do not coincide on exactly the same date each year since the climate of each year is not always identical. Generally speaking, however, the foregoing is a correct picture.

What, may one ask, is the reason for the depression in the curve of mid-summer ? In answer it may be said that similar phenomena are found in connection with other insects as in the case of the Mediterranean Fruit Fly or mealy bugs. Here, also, there is a drop in the population during July and August. However, whereas in these cases the reason is attributed to climatic conditions, this cannot be proven in connection with *Gynaikothrips ficorum*. Since the Thrips could be raised only outdoors, it was impossible to breed it under controlled conditions in order to answer this question conclusively. Perhaps during July and August there is a mortality of eggs due to the heat; also, reproduction may be impaired by it. Furthermore, the lack of new growth during these months prevents the formation of new pods. However, there is evidence that a third factor plays an important role in reducing the number of Thrips, namely, the predator *Ectemnus* spec.

ENEMIES OF GYNAIKOTHRIPS IN PALESTINE

The Role of Ectemnus

During the winter and spring months, this predator is rarely found. However, as the summer advances, it gradually increases, until in mid-summer it assumes large proportions.

Observations show that in the majority of pods, over 90 % have either live predators or show traces of their having been present. Traces remain in the form of empty egg shells, which have been sucked by the bug, or the moulted skin of the larvae. Although the number of the bug is considerably less than the Thrips, it readily overcomes it, until the preying animal no longer finds food and it begins to diminish due to starvation and cannibalism. Its reduced number again encourages the rise of the Thrips in September, which is once more followed by the rise of the predator.

Biology of Ectemnus

A description of *Ectemnus* is given by Mellis, 1934, and no repetition is therefore deemed necessary at this time. However, the egg seems to have been unknown to Mellis. The egg is laid in the tissue, inside the pod, under the epidermis, very much like the eggs of *Heliothrips*. An egg may be detected by the presence of an oblong ring near the opening of the egg and by the slightly elevated surface. The larvae which emerge feed upon the eggs or even upon the Thrips' larvae. The young larvae of the bug are very active and moult every two or three days. The later nymphical stage, however, lasts from 3-4 days. Thus, we may say that all of the immature stages, excluding the egg-stage, may last in the coastal plain of Palestine, about 12 days during August. If we bear in mind the fact that each individual consumes several eggs or larvae, we can readily appreciate the effects of its presence in the pod. As a matter of fact, from observations it is evident that one individual in a pod may exterminate the entire population of the pod and subsequently leave it in search of another. At any rate, the curves in Figure I show that with the rise of the number of the predators the number of the Thrips decreases steadily until the bugs likewise decrease. Again, it must be pointed out that the effects of the weather upon the Thrips and its predator are not definite, and further studies must be carried out in this direction.

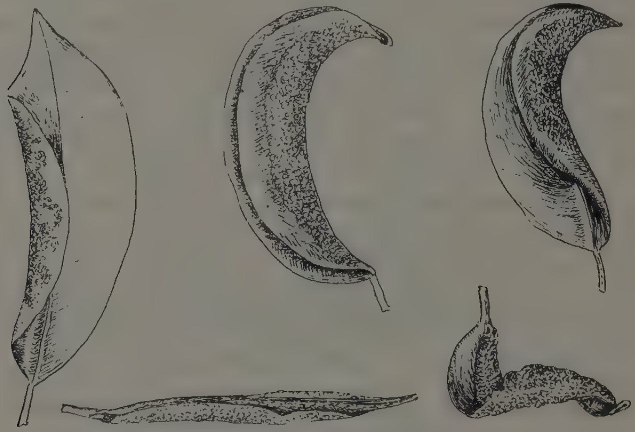

Fig. 2. — Various shapes of pods caused by *Gynaikothrips ficorum* on leaves of *Ficus nitida.*

The Pod

The pod is formed by the folding of the leaf, with the upper surface as a rule folded inside. The folding may be along the mid-rib, in which case the two halves cover each other entirely; it may be along the blade, at some distance from the mid-rib, and then only part of the leaf is folded. Due to differences in tissue growth in the attacked and the healthy parts of the leaf, the pod may assume various shapes. The mid-rib may bend to form a bow, or the leaf as a whole may become distorted into screw-like shapes, or cigar-like structures (See Figure 2).

The Mechanism of the Leaf-Folding

Microscopic studies were made of cross-sections of young, folded leaves. It was noticed that while the leaf is still in a state of growth, the feeding of the Thrips causes the hypertrophy of the parenchymatous tissue and this in turn causes the folding of the leaf over the Thrips. In the section of the young leaf in Figure 3 A, it is noticed that just at the « knee » of the fold, the tissue is abnormal, the palisades not distinct, and the entire parenchyma lacking a definite form. A clear picture may be obtained if one compares this structure with that in Figure 3 B, which is a cross-section of a healthy part in the same leaf. The difference is also noticeable in the width of the leaf in the affected and non-affected parts.

Hypertrophy of individual Cells

After the pod has been formed, and the leaf has completed its development, the continuous feeding of the Thrips or its larvae causes a depressed area in the place of feeding on the one hand, and an overdevelopment of the individual cells in the adjacent tissue on the other hand. This was especially noticed in the parenchyma. The enlarged cells extend outwardly and bring about a rugose elevation on the surface of the pod, which may even be distinguished with the naked eye. Such an elevation is shown in Figure 3 C. The enlarged cells may be compared with the adjacent, faintly noticeable cells over the leaf vessel. The thickened width of the leaf is noticeable.

Necrosis

Continuous feeding on one spot may cause the necrosis of palisades and also in the spongy tissue in the immediate vicinity. Such an area appears in the form of a brown homogenous spot in the cross-section, which may be seen in Figurre 3 A, just at the angle of the fold.

Anthocyanin

Young pods assume a pinkish colour, which eventually become brown in older leaves. The microscopic sections revealed that the parenchymatous cells, especially the palisades, are filled with an anthocyanin. This may be seen distinctly in Figure 3 C. Anthocyanin is well-known to be present in plant tissues affected by insects such as galls, or wounds caused by them. That the substance in this case is also Anthocyanin was demonstrated by the known reaction of KoH, which rendered it first blue, and then green.

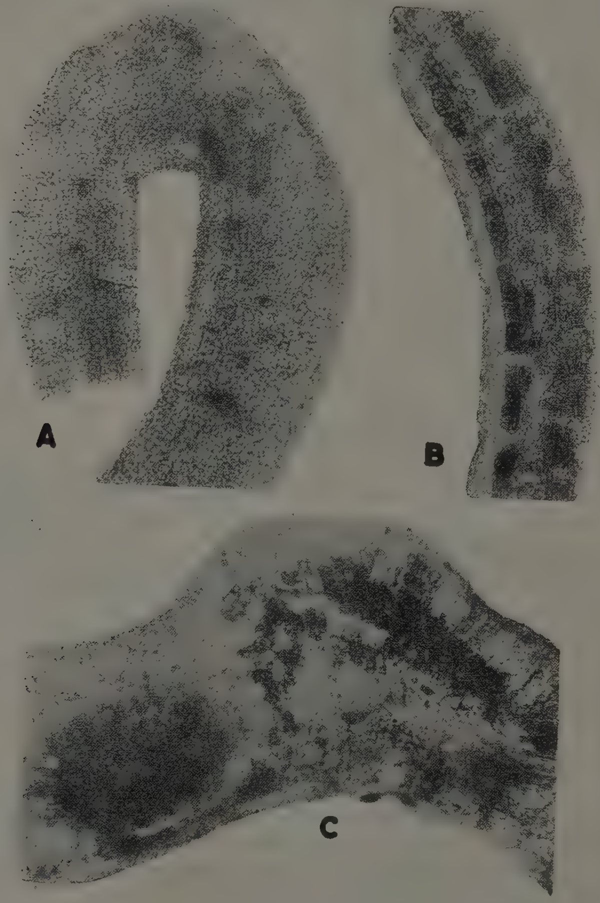

Fig. 3. — Cross-sections of leaves of *Ficus nitida:*

A. Young leaf in the process of forming the pod; B. A healthy section of the same leaf as in figure A (note difference in the thickness of the leaf and tissue); C. Cross-section of elevated surface due to the feeding of the *Gynaikothrips* (note the enlarged cells which swell into a tubercle-like elevation; notice also the cells filled with anthocyanin).

CONTROL

Spraying

A preliminary experiment was carried out to ascertain what insecticides could eradicate the pest. In this connection the most important factor was the penetrating qualities of the insecticide into the fold. The spraying was carried out with a high power Bean sprayer at a pressure of about 500 lbs. Oil was used in the form of an emulsion, an emulsifiable oil, and the tank mixture system.

The following substances and combinations were used :

1. Oil emulsion, 1 1/2 %.
2. Emulsifiable oil, 1 1/2 %.
3. White oil, 1 1/4 % + blood albumin, 0.03 %.
4. White oil, 1 1/2 + blood albumin, 0.03 % + emulsifier, 0.03 %.
5. White oil, 1 1/4 % + emulsifier, 0.03 % + Nicotine, 0.1 %.
6. Emulsifier, 0.03 % + Nicotine, 0.1 %.
7. Nicotine, 0.1 %.

The oil in each case was of a heavy type, with a distillation range of 27 % at 636° F, and unsulfonated residue of 98 %.

The Nicotine was of 40 % Nicotine sulfate; the Blood albumin was « Nicodust », and the Emulsifier was a Lauryl Sodium sulfate manufactured by the American Cyanamide Company.

Counts were made about two days after spraying of fifty leaves, picked at random, in each test. It was noticed that when there was a mortality, the entire population in the pod died. Therefore the mortality of the individual Thrips were not counted, only the percentage of leaves in which there was total mortality. With the exception of two, all of the tests gave entirely negative results.

The two sprays which caused some mortality were the combination of white oil + emulsifier + Nicotine, and Emulsifier + Nicotine. In both of these sprays, about 60 % of the pods contained killed Thrips. Since none of the oil sprays caused any mortality, it is apparent that the oil in the combination cannot be considered as the killing agent, but rather the Nicotine.

However, when Nicotine alone was used, no penetration took place. The emulsifier in this case plays a role of primary importance. The shape of the pod itself is a controlling factor. The penetration of the insecticide is likewise far easier in plain folds than it is in screw-like or cigar-like shapes. The pressure of the spray has considerable influence because with a hand spray hardly any mortality resulted.

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R

Nouvelle étude des *Tachysphex* de la faune égyptienne

[Hymenoptera : Sphecidae]

(avec 90 Figures)

par Jacques de Beaumont,
Conservateur du Musée Zoologique de Lausanne.

INTRODUCTION

Le genre *Tachysphex* comprend de très nombreuses espèces, réparties sur tous les continents. En ce qui concerne la région paléarctique, le seul travail d'ensemble est celui, déjà ancien, de Kohl (1884), dans lequel l'auteur décrit en détails 23 espèces. Actuellement c'est une centaine d'espèces qui sont connues de la région paléarctique ; une révision d'ensemble serait donc bien nécessaire mais, étant donné les difficultés que présente l'étude de ce genre, ne me semble guère possible pour l'instant. Par contre, des travaux consacrés à une région déterminée sont plus facilement réalisables et c'est ainsi que je présente cet essai sur les *Tachysphex* de la faune égyptienne.

L'histoire des études consacrées à ce genre dans la région qui nous intéresse ici peut être rapidement contée. Quelques espèces ont été décrites anciennement par Spinola, Dahlbom et Walker, sous les noms génériques de *Lyrops* et *Tachytes*. Ces espèces, insuffisamment décrites, ne peuvent être tirées au clair que par l'examen des types, ce qui ne m'a été possible que pour celles de Dahlbom. En 1897, Morice a décrit une série d'espèces des environs du Caire ; deux autres ont encore été décrites par Kohl (1888 et 1901). Quelques autres espèces ont été signalées de la région égyptienne.

Dans ce Bulletin a paru, en 1940, sous mon nom, un travail intitulé « Les *Tachysphex* de la faune égyptienne » et sur lequel je désire donner quelques renseignements. Ce petit mémoire représente en réalité des notes

Bull. Soc. Fouad Ier Entom., XXXI, 1947. [141].

préliminaires que j'avais envoyées à l'un de mes correspondants en Egypte et qui n'étaient pas destinées à l'impression. Ces notes furent cependant, et dans une intention très louable, publiées à mon insu au début de la guerre; et c'est à mon grand étonnement que j'appris un jour, en feuilletant le « Zoological Record », que j'étais l'auteur d'un travail sur les *Tachysphex* égyptiens; je dus même attendre jusqu'en 1946 pour voir mon œuvre !

Grâce à la grande amabilité et à la compréhension de Monsieur A. Alfieri, Secrétaire Général et Conservateur de la Société Fouad Ier d'entomologie, il m'est possible aujourd'hui de publier mon étude in extenso; ce sera, si l'on veut, une deuxième édition revue et augmentée du premier travail, dont elle a gardé l'ordonnance générale. Je n'ai cependant pas cru devoir répéter ici le détail des localités de capture, que l'on retrouvera également dans le travail de A.-M. Honoré (1942).

Je n'ai pu mener ce travail à chef que grâce à la grande obligeance de toute une série de collaborateurs, qui ont bien voulu me procurer le matériel nécessaire.

Ce sont tout d'abord mes collègues d'Egypte. Monsieur A. Alfieri m'a fait parvenir les exemplaires appartenant au Musée de la Société Fouad Ier d'entomologie et ceux de sa propre collection; le Professeur H. Priesner, alors Directeur de la Section d'entomologie du Ministère de l'Agriculture, a bien voulu m'adresser la collection de ce Département; enfin, le Professeur A. Mochi a mis à ma disposition l'abondant matériel provenant de ses riches récoltes.

Je dois aussi une grande reconnaissance aux Conservateurs de divers musées qui m'ont communiqué à l'examen une partie du matériel dont ils ont la garde et n'ont pas craint, dans beaucoup de cas, de me permettre d'étudier les types de diverses espèces. C'est ainsi que Monsieur R. B. Benson m'a soumis une partie de la collection de *Tachysphex* du British Museum. Grâce à Monsieur L. Berland, du Muséum d'Histoire naturelle de Paris, j'ai pu examiner de précieux types de Lucas, Dufour et Ferton, ainsi que de nombreux spécimens de *Tachysphex* de l'Afrique du Nord. Le Professeur G. D. Hale Carpenter m'a permis d'étudier la collection de F. D. Morice, conservée à l'University Museum d'Oxford, et contenant les types des espèces décrites par cet auteur. Mademoiselle G. Guiglia m'a soumis les *Tachysphex* du Musée de Gênes. Monsieur F. Maidl m'a fait parvenir une partie de la collection du Muséum de Vienne et plusieurs intéressants types de Kohl. Monsieur R. Malaise m'a adressé des types de Dahlbom, provenant de la collection Hedenborg, conservée au Muséum de Stockholm.

SOUS-GENRES ET GROUPES D'ESPECES

Il est toujours hasardeux de créer des coupures systématiques dans un genre lorsque l'on ne connait que les représentants d'une seule région. On s'expose ainsi à rencontrer plus tard, dans d'autres faunes, des espèces intermédiaires entre les sous-genres établis et qui diminuent ou détruisent la valeur de ceux-ci. Je crois cependant devoir extraire des *Tachysphex s.s.* une espèce qui présente des caractères très particuliers et pour laquelle j'ai créé le sous-genre *Holotachysphex*.

Quant aux autres espèces, elles forment un tout assez homogène et dans lequel des divisions sub-génériques seraient certainement artificielles. Cependant, en présence d'un genre comptant de nombreuses espèces, il est nécessaire d'établir un classement par groupes d'espèces. Cet arrangement présente le double avantage de créer de l'ordre dans un grand genre tout en n'introduisant pas de noms nouveaux dans la systématique. Ces groupes peuvent, sans grands inconvénients, être provisoires et modifiés au fur et à mesure des nouvelles découvertes. C'est ainsi que la plupart des groupes d'espèces que j'avais établis pour l'étude des *Tachysphex* de la faune française seront maintenus ici, que certains seront légèrement modifiés et que d'autres viendront s'y ajouter.

CARACTERES UTILISES POUR LA DETERMINATION

Il me semble inutile de signaler les principales caractéristiques par lesquelles les *Tachysphex* se distinguent des genres voisins de *Larrinae;* on trouvera des indications à ce sujet dans divers travaux, en particulier dans ceux de Kohl (1896) ou d'Honoré (1942). Mais je voudrais donner ici quelques renseignements sur certaines particularités que l'on peut utiliser pour la distinction des espèces.

Une foule de caractères peuvent être pris en considération pour la détermination, mais, pour ne pas allonger démesurément ce travail, il en est un certain nombre dont je n'ai fait qu'un usage restreint. Ainsi le vertex ou la face postérieure du propodéum présentent souvent d'utiles caractères distinctifs; ceux-ci sont cependant difficiles à décrire ou à figurer et j'ai préféré les laisser généralement de côté. Divers détails dans l'armature des pattes, dans la nervulation, dans la structure et la sculpture des sternites, dans la forme du labre, et bien d'autres particularités encore, pourront être étudiées avec profit. Dans les descriptions de la coloration, j'ai souvent omis, par simplification, la couleur des pièces buccales, des mandibules, des scapes et des tegulae.

La plupart des caractères dont il sera fait mention ne nécessitent pas d'explications complémentaires; on trouvera d'ailleurs des renseignements à ce sujet dans un travail précédent (1936, 1). Rappelons que l'on peut distinguer dans la partie médiane du clypéus, dont l'étude est d'une grande utilité, 3 zones : la partie basale, en général densément ponctuée et recouverte de pilosité ; la partie apicale, plus ou moins nettement limitée de la précédente, souvent glabre et à ponctuation espacée ; enfin la partie la plus antérieure, souvent séparée de la zone apicale par une rangée de points et représentant ce que j'ai nommé la lamelle. La distance qui sépare les yeux au vertex et que j'appelle simplement distance interoculaire peut être estimée, comme l'ont fait Kohl et ses successeurs, par rapport à la longueur des premiers articles du funicule ; il est évident que des mesures précises, à l'oculaire micrométrique, sont nécessaires. Ce caractère est fort utile dans certains cas, mais il ne faut pas perdre de vue qu'il est soumis, comme je l'ai signalé (1943), au phénomène de croissance dysharmonique, c'est-à-dire qu'il varie avec la taille des individus, principalement chez les mâles ; la distance interoculaire est toujours proportionnellement plus courte chez les grands individus d'une espèce donnée.

Pour la discrimination de certaines espèces, l'étude de l'armature génitale rendra de grands services ; c'est surtout la forme de la volsella et de ses soies que l'on prendra en considération ; leur examen nécessite la dissection de l'armature et l'emploi du microscope.

SYNONYMES

J'ai tenté d'établir avec autant de précision que possible la synonymie des diverses espèces et j'ai pour celà étudié la plupart des types qui m'étaient accessibles. Il est cependant certaines espèces, décrites anciennement, que je n'ai pu tirer au clair.

Parmi les *Lyrops* de Spinola, *savignyi* est sans doute *Liris haemorrhoidalis* F. ; *tarsalis*, d'après la référence à la figure 5, planche 13, de Savigny, doit être un *Tachytes* ; *erythropus* a souvent été considéré comme étant le « *Tachysphex fluctuatus* », mais j'ai indiqué, au paragraphe relatif à *mantivorus*, que cette synonymie est douteuse ; quant à *geniculatus*, il est possible que ce soit un *Tachysphex*, quoique l'affirmation que les tibias postérieurs sont inermes rende cette supposition peu vraisemblable.

J'ai pu me procurer les types des *Tachytes* égyptiens de Dahlbom ; *sordida* et *paloptera* sont des *Tachysphex*, *matronalis* est un *Tachytes*.

Il est possible que l'un ou l'autre des *Tachytes* décrits d'Egypte par Walker soit un *Tachysphex*, mais l'on ne peut le préciser sans avoir vu les types.

Je ferai encore remarquer qu'il n'est point exclu que certains *Tachysphex* étudiés dans ce travail soient synonymes d'espèces décrites de la région éthiopienne, en particulier par Arnold ; mais là encore, il est difficile de se prononcer avec certitude sans avoir vu des exemplaires typiques.

FORMES RESTEES DOUTEUSES

Je ne puis taire ici que cétte étude des *Tachysphex* égyptiens m'a réservé de grandes difficultés et qu'elle est très loin d'épuiser le sujet. En effet, si je décris 41 espèces qui me semblent en général bien caractérisées, il est resté bien des spécimens que je n'ai pu classer avec certitude. Dans les notes préliminaires de 1940, ces individus étaient brièvement signalés pour attirer l'attention de mes collègues d'Egypte qui auraient pu, par leurs recherches sur le terrain, préciser leur position taxonomique. J'ai préféré, dans le présent travail, les passer sous silence.

Ces formes douteuses embarassent fortement le systématicien, qui ne sait comment les traiter. Si l'on admet, ce qui semble généralement légitime, que les diverses espèces d'un genre peuvent être classées selon le mode « linnéen », on peut interpréter de deux manières ces individus isolés. Dans certains cas, l'étude d'un matériel plus abondant permettrait sans doute de montrer que l'étendue de la variation de certaines espèces est plus grande que ne pouvait le faire supposer l'examen d'individus trop peu nombreux ; les récalcitrants trouveraient alors naturellement leur place dans le cadre d'une espèce déjà connue. Dans d'autres cas, il est probable que ces spécimens douteux représentent de bonnes espèces, mais que le systématicien n'ose décrire sur des individus isolés.

On voit donc qu'il reste encore beaucoup à faire dans l'étude des représentants égyptiens du genre *Tachysphex*. La situation actuelle rendra certainement la détermination difficile, car l'entomologiste qui essayera d'identifier ses exemplaires à l'aide du présent travail pourra souvent se demander s'il se trouve en présence des espèces que j'ai tenté de définir ou s'il s'agit de l'une de celles qui me sont restées indéterminées. Il ne m'est malheureusement pas possible de faire mieux pour l'instant.

CARACTERES GENERAUX

DES TACHYSPHEX DE LA FAUNE EGYPTIENNE

Les travaux déjà consacrés à divers genres de *Sphecidae* d'Egypte ont montré l'originalité de la faune de cette région par rapport à celle des autres parties du bassin médinerranéen. Cette originalité résulte d'une part de la situation géographique de l'Egypte et d'autre part des conditions écologiques particulières qui y régnent. Il m'est d'ailleurs difficile pour le moment de préciser le rôle de ces deux facteurs dans la composition de la faune ; il me faudrait pour celà une étude sur le terrain, dont l'absence m'a fortement handicapé.

D'une façon générale, il m'a semblé que les espèces qui, en Egypte, se rencontrent dans les zones cultivées, ont d'autre part une aire de répartition assez étendue dans le bassin méditerranéen ou dans la région paléarctique. Les espèces plus proprement déserticoles ont par contre une répartition bien différente : s'il est difficile de savoir jusqu'où elles s'étendent au sud, il est certain que beaucoup d'entre-elles se retrouvent dans la région saharienne, en Cyrénaïque, en Tunisie, dans le Sud-Algérien et souvent plus à l'ouest encore.

Les documents que je possède ne me permettent pas de savoir quels sont les rapports, en ce qui concerne les *Tachysphex*, de la faune égyptienne et de la faune éthiopienne ; tout au plus pourrais-je signaler que quelques espèces méditerranéennes (*albocinctus*, *filicornis*) sont répandues sur une grande partie du continent africain. Quant aux rapports entre la faune de l'Egypte et celle de l'Asie occidentale, ils me semblent assez éloignés.

Il est un sujet que j'aurais très vivement désiré étudier sur place : c'est celui de l'adaptation des espèces déserticoles aux conditions écologiques particulières dans lesquelles elles vivent. Généralement, ces espèces sont d'une coloration très claire et revêtues de poils abondants, qui cachent leurs téguments ; dans certains cas (*osiris* ♀ et *isis* ♀), cette pilosité est entièrement couchée sur les téguments et forme sur la tête et le thorax un revêtement doté d'intenses reflets argentés ; dans d'autres cas (*vestitus*, *micans*, *luxuriosus*, etc.), la pilosité, quoique dense, est plus dressée et moins brillante. Le caractère adaptatif de ce revêtement découle de sa présence chez des espèces appartenant à des groupes différents, sans parenté étroite entre elles. Mais il est intéressant de noter qu'à côté de ces espèces claires et fortement velues, on trouve aussi dans la zone désertique des espèces noires, à pilosité peu développée (*priesneri* par exemple).

Tous ces problèmes écologiques mériteraient d'être étudiés de façon approfondie.

TABLE DE DETERMINATION

Distinction des sexes

♀ : 12 articles aux antennes ; 6 segments visibles à l'abdomen, le 6^e présentant une aire pygidiale en général nettement limitée ; fémurs antérieurs non échancrés à la base.

♂ : 13 articles aux antennes ; 7 segments visibles à l'abdomen, le 7^e sans aire pygidiale ; fémurs antérieurs presque toujours échancrés à la base.

♀ ♀

1. Mandibules sans échancrure à leur arête inférieure (fig. 88) ; pas de peigne aux tarses antérieurs (fig. 86) ; abdomen noir, brillant, avec une ponctuation nette et espacée .... T. (*Holotachysphex*) *holognathus* Morice

— Une échancrure à l'arête inférieure des mandibules (fig. 5) ; le tarse antérieur avec un peigne formé d'épines longues et fines ; pas de ponctuation nette à l'abdomen (Ss. G. *Tachysphex s.s.*) 2

2. Labre bombé, plus ou moins pointu à l'extrémité, dépassant nettement le bord antérieur du clypéus (fig. 3) ; galéa des maxilles à peu près aussi longue que le scape sans son bouton articulaire (fig. 7) 3

— Labre en forme de lame verticale aplatie, dépassant à peine le bord antérieur du clypéus ; galéa des maxilles beaucoup plus courte (fig. 30) 13

3. La distance interoculaire au vertex égale au moins la longueur des articles 2 + 3 du funicule (fig. 23) ; face dorsale du propodéum plus ou moins nettement striée 4

— La distance interoculaire égale au plus la longueur des articles 1 + 2 du funicule (fig. 3) ; face dorsale du propodéum non striée 5

4. Abdomen entièrement rouge .... *T. luxuriosus* Morice

— Extrémité de l'abdomen noire .... *T. horus* de B.

5. Abdomen entièrement noir, ailes fortement enfumées... *T. chephren* de B.

— Abdomen rouge, au moins à la base ; ailes rarement enfumées 6

6. Mandibules avec une échancrure très développée ; leur partie basale, avant l'échancrure, plus haute que longue et terminée par un angle proéminent (fig. 6) ; des bandes de pruinosité sur les 5 premiers tergites .... *T. buyssoni* Morice

— Mandibules avec une échancrure moins développée ; leur partie basale plus longue que haute (fig. 5) 7

7. Le plus long éperon des tibias postérieurs avec des dents plus fortes que chez les autres espèces (fig. 10) ; tout le thorax et le propodéum recouverts d'une abondante pilosité d'aspect laineux ; des bandes de pruinosité sur les 5 premiers tergites .... *T. micans* Rad.

— Le plus long éperon des tibias postérieurs avec des dents plus fines ; la pilosité beaucoup moins développée, sans aspect laineux ; pas de bande de pruinosité sur le 5e tergite 8

8. Bord antérieur du clypéus sans échancrure au milieu 9

— Bord antérieur du clypéus avec une petite échancrure au milieu (figs. 3 et 4) 10

9. Articles des palpes très longs (fig. 2) ; aire pygidiale à peu près plane, étroite et pas très brillante ; pas de pruinosité argentée sur les tergites abdominaux .... *T. longipalpis* de B.

— Articles des palpes plus courts (voir fig. 3) ; aire pygidiale assez large, bombée et très brllante ; des bandes de pruinosité peu nettes sur les tergites abdominaux .... *T. mycerinus* de B.

10. Ailes antérieures nettement enfumées ; pas de bandes de pruinosité sur les tergites abdominaux .... *T. gracilicornis* Mercet

— Ailes antérieures hyalines ou très peu enfumées; des bandes de pruinosité sur les tergites abdominaux 11

11. Aire pygidiale brillante, assez large (fig. 12); bord antérieur du clypéus avec un petit décrochement de chaque côté, près de ses angles latéraux (fig. 4), qui disparaît chez les individus usés; une ou deux épines bien développées sur l'arête supérieure du métatarse 3 ...... *T. pygidialis* Kohl

— Aire pygidiale moins brillante, finement chagrinée, plus étroite (fig. 11); bord antérieur du clypéus simplement sinué près de ses angles latéraux (fig. 3): métatarse postérieur généralement dépourvu d'épines sur sa face supérieure 12

12. Face dorsale du propodéum recouverte d'une pilosité dense, cachant la sculpture chez les individus frais; la distancce interoculaire est plus courte que la longueur du 2e article du funicule .... *T. cheops* de B.

— Pilosité du propodéum moins dense, ne cachant pas la sculpture; la distance interoculaire est presque toujours au moins égale à la longueur du 2e article du funicule .... *T. panzeri* v.d. Lind.

13. Abdomen entièrement noir 14

— Abdomen rouge, au moins à la base 30

14. Le plus grand éperon des tibias postérieurs avec des dents espacées et très fortes (fig. 47); mésonotum avec une sculpure réticulée (fig. 46); une bande enfumée au travers des ailes antérieures (fig. 44) .... *T. schmiedeknechti* Kohl

— Le plus grand éperon des tibias postérieurs avec des dents fines et serrées; mésonotum plus ou moins nettement ponctué; pas de bande enfumée aux ailes antérieures 15

15. Propodéum et base du premier tergite avec une forte pilosité d'aspect laineux; aire pygidiale tout à fait mate, finement réticulée (fig. 39)... 16

— La pilosité du propodéum n'est jamais laineuse; aire pygidiale presque toujours plus ou moins brillante, jamais réticulée 17

16. Ailes hyalines .... *T. albocinctus* Lucas

— Ailes teintées de jaune à la base .... *T. dusmeti* Giner Mari

17. Aire pygidiale large et arrondie à l'extrémité (fig. 62) 18

— Aire pygidiale plus étroite et triangulaire 19

18. Côté du propodéum en général finement striés; clypéus moins aplati ... . *T. julliani* Kohl

— Côtés du propodéum sans stries; clypéus plus aplati ... *T. abjectus* Kohl

19. Pas de suture episternale aux mésopleures (fig. 81); cellule radiale très fortement tronquée (fig. 82); aire pygidiale très mate .... *T. imperfectus* de B.

— Une suture épisternale aux mésopleures; cellule radiale moins fortement tronquée; aire pygidiale plus ou moins brillante 20

20. Tibias en partie rouges 21

— Tibias entièrement noirs 23

21. Premier sternite abdominal caréné longitudinalement (fig. 29) ; vertex relativement étroit ; bord antérieur du clypéus non anguleux 22

— Premier sternite non caréné ; vertex large (fig. 75) ; bord antérieur du clypéus anguleux ; bord postérieur des tergites largement décoloré .... *T. fasciatus* Morice

22. Fémurs 1 et 2 portant une pilosité dressée assez longue ; aire pygidiale nettement bordée (voir fig. 35) .... *T. maidli* de B.

— Fémurs 1 et 2 sans pilosité dressée ; aire pygidiale plus étroite et moins nettement bordée (fig. 34) .... *T. mantivorus* de B.

23. Faces latérales du propodéum très brillantes, avec une ponctuation très fine et espacée ; face dorsale du propodéum très fortement striée ; face à sculpture très fine et d'aspect soyeux .... *T. plicosus* Costa

— Faces latérales du propodéum plus ou moins nettement striées, sa face supérieure moins nettement striée ; face ponctuée ou chagrinée 24

24. Base du premier tergite garnie de pilosité dressée ; vertex, vu de face, concave (fig. 74) ; mésopleures mates, sans ponctuation distincte .... *T. priesneri* de B.

— Base du premier tergite sans pilosité dressée ; vertex non concave ; mésopleures brillantes ou nettement ponctuées 25

25. Mésopleures très brillantes, lisses ou à peine ponctuées ; taille faible, ne dépassant pas 8 mm. ; face inférieure du scape et extrémité de l'aire pygidiale généralement tachées de ferrugineux .... *T. cabrerai* Mercet

— Mésopleures plus ou moins distinctement ponctuées, au moins dans leur partie antérieure ; taille généralement plus grande ; scapes et aire pygidiale généralement noirs 26

26. Antennes très longues ; les articles médians du funicule 4 ou 5 fois plus longs que larges .... *T. filicornis* Kohl

— Antennes moins longues ; les articles médians du funicule au plus 3 fois plus longs que larges 27

27. Mésopleures brillantes, à ponctuation indistincte dans leur partie postérieure ; la distance interoculaire égale la longueur des articles 2 + 3 du funicule ; clypéus très aplati, sans aire apicale nettement limitée .... *T. helveticus* Kohl

— Mésopleures distinctement ponctuées sur toute leur surface ; la distance interoculaire est plus courte que la longueur des articles 2 + 3 du funicule ; clypéus moins aplati, avec une aire apicale brillante nette 28

28. Aire apicale brillante du clypéus plus longue ou aussi longue au milieu que l'aire basale ponctuée .... *T. nitidus* Spin.

— Aire apicale du clypéus plus courte que l'aire basale 29

29. Deuxième sternite à ponctuation très étendue; ponctuation de la face et du thorax plus forte et plus espacée .... *T. nitidior* de B.
— Partie postérieure du 2e sternite largement imponctuée; ponctuation de la face et du thorax plus serrée .... *T. tarsinus* Lep.
30. Tibias noirs 31
— Tibias plus ou moins tachés de rouge 32
31. Ponctuation du disque du mésonotum espacée, les espaces plusieurs fois plus grands que les points; pattes fortement épineuses; le plus grand éperon du tibia 3 dépasse l'apex du métatarse ... *T. cyrenaïcus* nov. spec.
— Ponctuation du mésonotum beaucoup plus dense; pattes peu épineuses; le plus grand éperon du tibia 3 n'atteint pas l'apex du métatarse .... *T. pompiliformis* Pz.
32. Premier sternite très distinctement caréné (fig. 29); aire pygidiale plus ou moins pointue à l'extrémité (fig. 35) 33
— Premier sternite non caréné ou, s'il l'est légèrement, aire pygidiale large à l extrémité 36
33. Tête et thorax entièrement couverts d'une pilosité couchée ayant des reflets argentés très brillants .... *T. osiris* de B.
— Pilosité de la tête et du thorax beaucoup moins dense, laissant voir la sculpture, au moins par endroits 34
34. Espèce de grande taille (12-17 mm.), à pattes presque entièrement rouges et avec des bandes de pruinosité très développées sur les 4 premiers tergites .... *T. grandissimus* Gussak.
— Espèce de taille en moyenne plus faible, ou à fémurs en partie noirs et à pruinosité faiblement développée sur l'abdomen 35
35. Espèce plus grande: 13-15 mm. Bord antérieur du clypéus montrant de chaque côté une petite dent avant ses angles latéraux, eux mêmes saillants; base de l'abdomen d'un rouge très foncé.........*T. sordidus* Dahlb.
— Espèce plus petite: 10-12 mm. Bord antérieur du clypéus sans dent près de ses angles latéraux; base de l'abdomen d'un rouge plus clair .... *T. costai* Destef.
36. Vertex large et, vu de face, nettement concave (fig. 76); aire pygidiale étroite et assez brillante .... *T. speciosissimus* Morice
— Vertex plus étroit, pas distinctement concave 37
37. Aire pygidiale très large à l'extrémité (fig. 62) ou distinctement divisée en deux zones différemment sculptées (fig. 63); face peu bombée...... 38
— Aire pygidiale autrement conformée; face plus ou moins nettement bombée; pilosité en général très dense 39
38. Bord antérieur du clypéus anguleux au milieu (fig. 55); aire pygidiale brillante dans sa partie basale, striolée dans sa partie apicale (fig. 63)... .... *T. incanus* de B.

— Bord antérieur du clypéus à peu près rectiligne au milieu ; aire pygidiale brillante, au moins dans sa partie postérieure .... *T. julliani* Kohl

39. Tête et thorax recouverts d'une pilosité appliquée très dense, à très vifs reflets argentés ; aire pygidiale nettement bordée, brillante et rétrécie dans sa partie postérieure ; face bombée (fig. 36) .... *T. isis* de B.

— La pilosité est dense aussi, mais elle n'a pas, sur le thorax, de très vifs reflets argentés ; aire pygidiale autrement conformée 40

40. Face très fortement proéminente (fig. 56) ; base du funicule rouge ; 7-8 mm. .... *T. deserticola* de B.

— Face moins bombée (fig. 54) ; funicule noir ; 8-10 mm. .... *T. vestitus* Kohl

♂ ♂

1. Mandibules sans échancrure à leur arête inférieure (fig. 88) ; abdomen noir brillant, avec une ponctuation nette et espacée .... *T. (Holotachysphex) holognathus* Morice

— Une échancrure à l'arête inférieure des mandibules (fig. 5) ; pas de ponctuation nette à l'abdomen (Ss. G. *Tachysphex s.s.*) 2

2. Labre bombé, plus ou moins pointu à l'extrémité, dépassant nettement le bord antérieur du clypéus (fig. 3) ; galea des maxilles à peu près aussi longue que le scape sans son bouton articulaire (fig. 7) 3

— Labre en forme de lame aplatie, dépassant à peine le bord antérieur du clypéus ; galea des maxilles beaucoup plus courte (fig. 30) 15

3. Fémurs antérieurs sans échancrure à la base ; la distance interoculaire est au plus aussi grande que de la longueur des 2 premiers articles du funicule 4

— Fémurs antérieurs échancrés à la base (voir par ex. fig. 31) ; la distance interoculaire est au moins aussi grande que la longueur des 3 premiers articles du funicule 5

4. Tarse antérieur avec un peigne : les épines situées à l'extrémité du 2e article dépassent l'apex du 3e ; abdomen noir à l'extrémité .... *T. horus* de B.

— Tarse antérieur sans peigne ; abdomen entièrement rouge .... *T. luxuriosus* Morice

5. Peigne du tarse antérieur bien développé ; les épines situées à l'extrémité du 2e article dépassent l'apex du 3e (fig. 8) 6

— Peigne du tarse antérieur absent ou moins développé ; les épines de l'extrémité du 2e article atteignent tout au plus l'apex du 3e (fig. 9) 11

6 Mandibules avec une échancrure très développée, comme chez la ♀ (fig. 6) .... *T. buyssoni* Morice

— Mandibules avec une échancrure moins développée (fig. 5) 7

7. Le plus grand éperon des tibias postérieurs avec des dents plus fortes que chez les autres espèces (fig. 10) ; tout le thorax et le propodéum recouverts d'une abondante pilosité d'aspect laineux ...... *T. micans* Rad.

— Le plus grand éperon des tibias postérieurs avec des dents plus fines ; la pilosité beaucoup moins développée, sans aspect laineux ; espèces que l'on ne peut distinguer sûrement que par l'étude de l'armature génitale. 8

8. Pilosité de la face franchement argentée jusqu'en dessus de l'insertion des antennes, dorée plus haut ; extrémité de l'abdomen noire ; pas d'échancrure au milieu du bord antérieur du clypéus ... *T. mycerinus* de B.

— Pilosité de la face presque toujours entièrement dorée ou argentée ; abdomen souvent entièrement rouge ; souvent une petite échancrure au milieu du bord antérieur du clypéus 9

9. Pilosité du thorax plus développée, cachant complètement la sculpture sur la face dorsale du propodéum chez les individus frais ; pilosité de la face toujours argentée ; distance interoculaire plus courte que la longueur des 2 premiers articles du funicule .... *T. cheops* de B.

— Pilosité du thorax moins développée, ne cachant pas la sculpture, même chez les individus frais ; la distance interoculaire égale la longueur des deux premiers articles du funicule 10

10. Extrémité de l'abdomen noire ; pilosité du clypéus dorée ; peigne moins développé .... *T. palopterus* Dahlb.

— Abdomen souvent entièrement rouge ; pilosité du clypéus souvent argentée ; peigne plus développé .... *T. panzeri* v.d. Lind.

11. Abdomen noir ; pattes presque entièrement noires ; ailes antérieures fortement enfumées .... *T. chephren* de B.

— Abdomen et pattes au moins en partie rouges ; ailes souvent hyalines .. 12

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— Ailes antérieures hyalines ou régulièrement enfumées ; palpes et langue courts ; espèces que l'on ne peut distinguer sûrement que par l'étude de l'armature génitale 13

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— Ailes antérieures pas ou peu enfumées ; en général des bandes de pruinosité sur l'abdomen 14

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— Abdomen souvent entièrement rouge ; peigne moins développé (fig. 9)... .... *T. pygidialis* Kohl

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— Abdomen au moins en partie rouge 33

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— Faces latérales du propodéum non striées; pas de lamelle dans l'échancrure des fémurs antérieurs (fig. 59); clypéus: fig. 58 *T. abjectus* Kohl

22. La distancce interoculaire égale la longueur des 3 premiers articles du funicule; premier sternite non caréné; extrémité des tergites largement décolorée .... *T. fasciatus* Morice

— La distance interoculaire égale au plus la longueur des 2 premiers articles du funicule; premier sternite caréné (fig. 29) 23

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— Tarses antérieurs avec un peigne rudimentaire ; 2 épines apicales externes aux articles 1 et 2 39

39. Mésonotum et scutellum mats, à ponctuation dense ; face peu bombée ... . *T. grandissimus* Gussak.

— Mésonotum et surtout le scutellum à ponctuation beaucoup moins dense, brillants ; face fortement bombée .... *T. osiris* de B.

40. Le bord antérieur du clypéus forme au milieu un angle très prononcé (fig. 57) .... *T. julliani* Kohl

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— Face moins proéminente ; une profonde échancrure aux fémurs antérieurs 42

42. La distancec interoculaire égale la longueur des articlces 2 et 3 du funicule .... *T. vestitus* Kohl

— La distance interoculaire égale la longueur des articles 1 et 2 du funicule .... *T. incanus* de B.

SOUS-GENRE *TACHYSPHEX* s.s.

Mandibules échancrées à leur bord inférieur ; tarses antérieurs de la ♀ avec un peigne bien développé, formé d'épines fines ; les deux premiers tergites très indistinctement carénés sur les côtés ; l'abdomen n'est jamais distinctement et fortement ponctué.

Le type du sous-genre, comme celui du genre, est *T. filicornis* Kohl.

GROUPE DE *PANZERI*

Les espèces formant ce groupe et le suivant (*luxuriosus*) sont nettement caractérisées par la structure de leurs pièces buccales. Le labre qui, chez les autres espèces, se présente sous forme d'une lame verticale, dépassant à peine le bord antérieur du clypéus, est ici fortement bombé, plus ou moins pointu à l'extrémité et dépassant beaucoup le clypéus. Les maxilles et le labium sont allongés ; c'est ainsi que la galéa est nettement plus longue que large à la base, au moins aussi longue que le scape sans son bouton articulaire (figs. 3 et 7). On peut noter que, suivant les spécimens, c'est l'une ou l'autre de ces particularités qui apparaît : si les pièces buccales sont repliées, cachant la galéa, le labre est bien visible ; si au contraire les pièces buccales sont étendues, le labre est parfois rabattu en arrière et peu visible. Le clypéus est plus bombé que chez les espèces appartenant aux autres groupes.

Outre la structure des pièces buccales et du clypéus, les espèces du groupe de *panzeri* présentent encore d'autres particularités. Le vertex est étroit et les tempes peu développées ; le propodéum est allongé et n'est pas carrément tronqué en arrière. La sculpture des téguments est toujours très fine ; il n'y a jamais, sur le thorax, de ponctuation nette sur fond brillant ; la face dorsale du propodéum est finement chagrinée. Les pattes sont allongées, avec des épines longues et pointues. Chez la ♀, il n'y a en règle générale qu'une seule longue épine à l'angle inféro-externe de l'extrémité du tibia antérieur ; les métatarses postérieurs sont souvent dépourvus d'épines sur leur face supérieure. La cellule anale de l'aile postérieure est moyennement large à l'extrémité ; aux ailes antérieures, la cellule radiale est en général peu tronquée à l'extrémité et la 3e cubitale nettement étirée.

Ce groupe présente de très grandes difficultés systématiques. Dans le matériel que j'ai étudié se trouvaient quelques espèces bien caractérisées que je décris ici. Mais il est resté un nombre assez élevé de spécimens, appartenant probablement à diverses espèces, que je n'ai pu définir clairement pour le moment. L'étude de l'armature génitale rend de précieux services, mais il faut tenir compte d'une variation individuelle souvent assez étendue.

Tachysphex panzeri v.d. Lind.

♀. 9-15 mm. Corps noir, plus ou moins varié de rouge. Les spécimens d'Egypte ont généralement l'abdomen entièrement rouge (var. *oraniensis* Lep.) mais l'on trouve fréquemment aussi des exemplaires dont les derniers segments sont noirs ; le clypéus et les tubercules huméraux sont souvent jaunes. On rencontre tous les intermédiaires entre les individus les plus clairs et les plus foncés. Sur les pattes, la couleur rouge s'étend toujours aux tibias et aux tarses, mais peut envahir aussi les fémurs, ainsi qu'une partie des trochanters et des hanches. Ailes légèrement teintées de gris ou de jaunâtre. La pilosité de la face est argentée ; celle du thorax n'est jamais très dense et laisse toujours apercevoir la sculpture des téguments. L'abdomen porte des bandes de pruinosité à l'extrémité des quatre premiers tergites ; la 4e bande manque parfois chez les individus de la var. *oraniensis*.

Le clypéus, bombé comme chez toutes les espèces de ce groupe, présente un bord antérieur sinué sur les côtés et muni d'une petite échancrure médiane (fig. 3). Le 2e article du funicule est de 2 1/2 à 3 fois aussi long que large l'extrémité. Front et vertex à ponctuation très fine. La distance interoculaire égale à peu près la longueur du 2e article du funicule, parfois un peu moins chez les grands individus ou un peu plus chez les petits spécimens. Tempes moyennement développées. Ponctuation du mésonotum et du scutellum très fine et dense ; côtés du thorax et faces supérieure et latérales du propodéum microscopiquement chagrinés, mats ; de très fines stries apparaissent parfois sur les côtés du propodéum chez les très grands individus la face postérieure du propodéum est assez brillante, avec une fossette longitudinale et de fortes côtes transversales. Aire pygidiale (fig. 11) relativement étroite, microscopiquement chagrinée, avec de petits points épars et indistincts. Les fémurs sont relativement épais, les tarses assez grêles ; le 2e article du tarse postérieur est 2 3/4 fois aussi long que large à l'extrémité ; le métatarse postérieur ne montre d'épines à sa face supérieure que chez les grands exemplaires.

♂. 6,5-11 mm. La couleur rouge est en général moins étendue chez la ♀, mais je n'ai pas vu d'Egypte de spécimens à abdomen entièrement noir (var. *discolor* Friv.). La pilosité de la face est en général dorée, mais elle peut aussi être argentée, en particulier chez les individus à coloration rouge étendue. Pilosité du thorax comme chez la ♀ ; le 4e tergite est dépourvu de pruinosité argentée.

La forme du clypéus est moins constante que chez la ♀ ; la petite échancrure, au milieu du bord antérieur, est parfois indistincte. La distance interoculaire égale à peu près la longueur des 2 premiers articles du funicule réunis. Echancrure de la base des fémurs antérieurs nette. Peigne du tarse antérieur formé d'épines plus ou moins longues, mais celles qui se trouvent à l'extrémité du 2e article dépassent toujours nettement l'apex du 3e article (fig. 8).

Armature génitale : La figure 13 montre la forme moyenne de la volsella ; l'appendice dorsal de celle-ci peut être plus ou moins développé selon les individus ; les soies, les apicales surtout, sont généralement un peu sinueuses à l'extrémité ; quelques unes peuvent être terminées par un petit bouton.

Etant donné l'inconstance de la taille et de la coloration, l'aspect de la ♀ de *panzeri* est très variabe ; on la reconnaîtra cependant en examinant la pilosité, la forme de l'aire pygidiale et celle du clypéus. Les ♂♂ sont souvent très difficiles à distinguer des autres espèces ayant un long peigne au tarse antérieur et l'étude de l'armature génitale permettra seule une détermination certaine.

Espèce répandue dans une grande partie de la région paléarctique. J'ai étudié de nombreux exemplaires d'origine égyptienne.

Tachysphex cheops de Beaumont

♀. 10-14 mm. Clypéus jaunâtre ; abdomen entièrement rouge, sauf parfois des ombres noires sur le 5e tergite. Pattes rouges, sauf les hanches, les trochanters et une partie des fémurs. Ailes hyalines. Pilosité plus développée que chez *panzeri*, cachant presque complètement, chez les individus frais, la sculpture de la face, des mésopleures et de la face dorsale du propodéum. Des bandes de pruinosité sur les 4 premiers tergites.

Voisine morphologiquement de *panzeri*, dont elle se distingue par l'aire apicale brillante du clypéus plus courte et plus bombée, les antennes plus longues, la distance interoculaire nettement plus courte que le 2e article du funicule, les tempes moins développées, les fémurs plus épais, les tarses moins grêles (le 2e article du tarse postérieur à peu près 2 1/4 fois aussi long que large à l'extrémité), l'aire pygidiale souvent plus brillante, mais à surface plus irrégulière. Les côtés du propodéum présentent parfois quelques stries obliques, mais ce caractère n'est bien visible que chez les individus à pilosité usée.

♂, 6-13 mm. Coloration comme chez la ♀. Pilosité de la face argentée, celle du thorax aussi développée que chez la ♀. Les 3 premiers tergites sont recouverts d'une pruinosité argentée assez dense, tandis que celle-ci, sur les tergites suivants, est d'un brun foncé ; l'abdomen a de ce fait un aspect bicolore nettement tranché.

Antennes plus longues que chez *panzeri* ; distance interoculaire plus courte que la longueur des 2 premiers articles du funicule réunis. Pattes antérieures comme chez les *panzeri*.

Armature génitale : La volsella se distingue bien de celle de *panzeri* par son appendice dorsal étroit et allongé (fig. 14).

T. cheops est semblable au premier abord à la var. *oraniensis* de *panzeri*, mais s'en distingue en général facilement par les caractères indiqués.

J'ai étudié 21 ♂♂ et 16 ♀♀ d'Egypte ; j'ai vu également 1 ♂ de Benghazi. Il me semble très probable que la volsella d'un individu de Lybie représentée par Guiglia (1940), sur la figure 39, 1, se rapporte à cette espèce.

Tachysphex buyssoni Morice

♀. 13-15 mm. Le clypéus et l'abdomen sont rouges, avec parfois des zones noires sur les tergites 3-5. Pattes en grande partie rouges. Ailes hyalines. Pilosité plus développée que chez *panzeri*, mais moins que chez *cheops*. Les tergites 1-5 portent des bandes de pruinosité argentée.

L'échancrure de l'arête inférieure des mandibules est beaucoup plus développée que chez toutes les autres espèces du groupe (fig. 6) ; la partie basale, avant l'échancrure, n'est pas plus longue que large et se termine par un angle proéminent. Clypéus conformé comme celui de *panzeri*. La distance interoculaire est à peine plue courte que le 2e article du funicule. Tempes comme chez *cheops*. Sculpture de la tête et du thorax comme chez les espèces précédentes. Aire pygidiale sculptée comme celle de *panzeri*, mais un peu plus étroite. Pattes comme chez cette espèce. Tellule anale de l'aile postérieure plus large à l'extrémité que chez les autres espèces du groupe.

♂. 9-12 mm. Coloration comme chez la ♀, mais les derniers segments abdominaux et la plus grande partie des fémurs sont généralement noirs. Pilosité de la face en général dorée ; des bandes de pruinosité sur les 3 premiers tergites.

Mandibules conformées comme celles de la ♀. Distance interoculaire un peu plus courte que les 2 premiers articles du funicule réunis. Pattes antérieures comme chez *panzeri*.

Armature génitale : la volsella est courte et large ; les soies basales sont très fortes, les soies apicales sinueuses à l'extrémité, sans bouton terminal (fig. 18).

T. buyssoni ressemble à *cheops* et à *panzeri* var. *oraniensis*, mais s'en distingue facilement par la structure des mandibules.

J'ai pu étudier les types de cette espèce, ainsi que 4 ♂♂ et 8 ♀♀, provenant tous d'Egypte.

Tachysphex micans Radoszkowski

♀. 8-10 mm. Clypéus jaunâtre ; abdomen et pattes, à l'exception d'une partie des hanches, des trochanters et de la base des fémurs, rouges. Ailes entièrement hyalines, à nervures pâles. Toute la tête, le thorax et le propodéum sont entièrement recouverts d'une pilosité très dense, cachant complètement la sculpture chez les individus frais. Sur la face, cette pilosité est argentée et couchée ; sur le thorax et le propodéum, elle a une apparence laineuse caractéristique, blanche sur les faces latérales, plus ou moins jaunâtre sur la face dorsale. Sur les 5 premiers tergites, la pruinosité argentée est très développée. Pattes beaucoup plus velues que chez les autres espèces du groupe.

L'échancrure médiane du bord antérieur du clypéus est peu marquée. Distance interoculaire égalant à peu près la longueur du 2e article du funicule. Tempes peu développées. Les téguments du thorax et du propodéum, visibles seulement si les poils sont arrachés, apparaissent plus brillants que chez *panzeri*. Aire pygidiale et pattes à peu près comme chez cette espèce. Les dents de la moitié apicale du plus grand éperon des tibias postérieurs sont plus fortes et moins serrées que chez les autres espèces du groupe (fig. 10), mais il y a une certaine variation dans cette disposition. La cellule radiale est plus fortement tronquée à l'extrémité que chez *panzeri*.

♂. 7 mm. Coloration et pilosité comme chez la ♀ ; il existe des bandes de pruinosité argentée sur les 4 premiers tergites.

La distance interoculaire est un peu plus grande que le 2e article du funicule. Eperons des tibias postérieurs comme chez la ♀. Pattes antérieures comme chez *panzeri*.

Armature génitale : Je figure (fig. 15) ici la volsella d'un spécimen égyptien, qui se distingue de celle d'un individu transcaspien que j'ai représentée ailleurs (1936, 2), par l'appendice dorsal de la volsella plus élargi ; les soies sont sinueuses à l'extrémité, sans bouton terminal. Les crochets de l'armature ne montrent pas de dents distinctes.

Parmi les espèces égyptiennes de ce groupe, *T. micans* se distingue aisément à sa pilosité particulière et, généralement aussi, à la structure de ses éperons postérieurs.

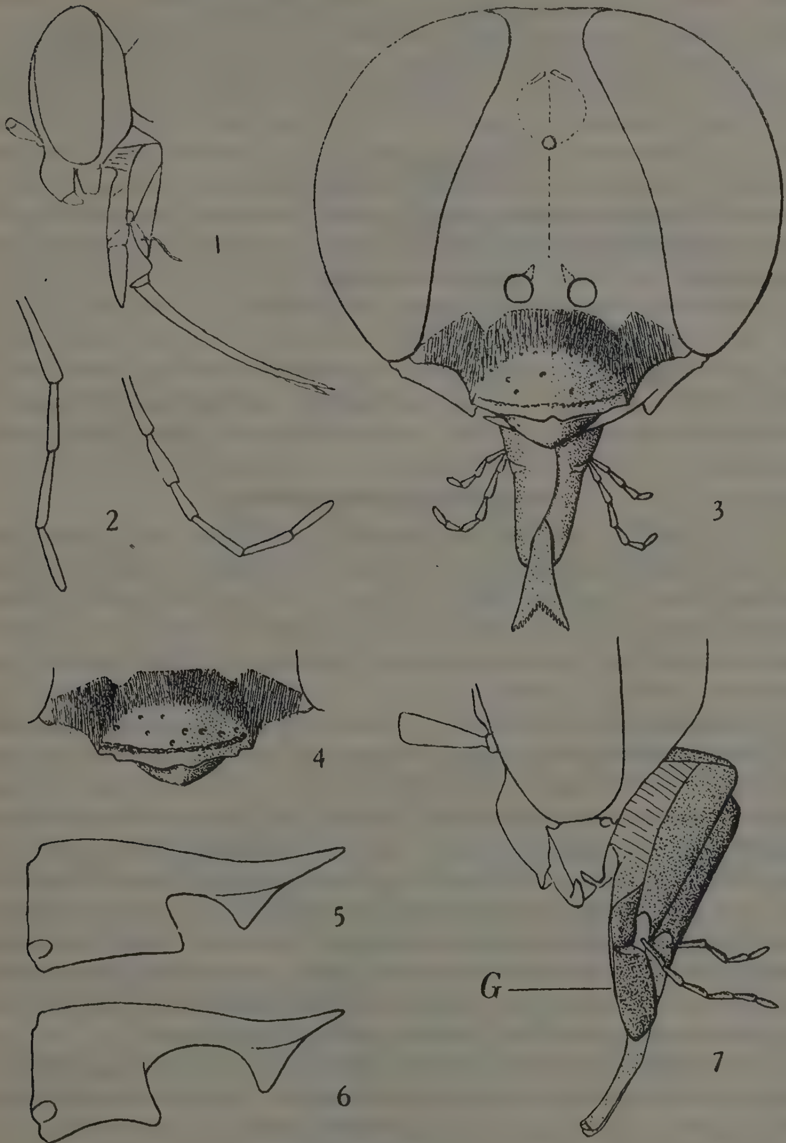
C'est avec un léger doute que je rapporte à *micans*, espèce de l'Asie occidentale, les individus d'Egypte décrits ci-dessus. J'avais déjà signalé (1936, 2) une certaine variation dans les caractères de cette espèce et il faudrait un matériel plus abondant pour élucider ce point ; je n'ai pu étudier qu'un ♂ et 5 ♀♀ d'origine égyptienne.

Tachysphex longipalpis de Beaumont

♀. 12 mm. Clypéus, abdomen et pattes rouges, à l'exception de zones foncées sur les hanches, trochanters et fémurs antérieurs. Ailes à peu près hyalines, à nervulation pâle. Pilosité de la face argentée ; celle du thorax, d'un blanc argenté, couchée, assez dense, cache à peu près complètement la sculpture du mésonotum, des mésopleures et du haut des faces latérales du propodéum ; elle est un peu moins dense sur le reste du thorax. L'abdomen est dépourvu de pruinosité argentée.

Les pièces buccales sont très allongées ; les articles des palpes, en particulier, sont nettement plus longs que chez les autres espèces du groupe (fig. 2). Chez la seule ♀ que j'ai étudiée, la langue était repliée, mais je présume qu'elle doit être semblable à celle du ♂. Le clypéus est fortement convexe, sans échancrure au milieu de son bord antérieur ; le labre est très proéminent et très bombé. Distance interoculaire un peu plus courte que le 2e article du funicule. Tempes très peu développées. L'aire pygidiale a la forme de celle de *panzeri*, mais elle est plus brillante. Pattes comme chez cette espèce, mais les fémurs sont moins épais.

♂. 8-9 mm. Coloration comme chez la ♀. Ailes antérieures très distinctement jaunies, sauf dans la zone apicale, après les cellules, qui est hyaline. Pilosité de la face dense et dorée ; celle du thorax beaucoup plus fine que chez la ♀, laissant partout apercevoir les téguments. Un dimorphisme



Tachysphex du groupe de *panzeri*

Fig. 1 : *T. longipalpis* ♂, tête vue de profil. — Fig. 2 : id., palpes. — Fig. 3 : *T. panzeri* ♀, tête vue de face. — Fig. 4 : *T. pygidialis* ♀, clypéus. — Fig. 5 : *T. panzeri*, mandibule. — Fig. 6 : *T. buyssoni*, id. — Fig. 7 : *T. panzeri* ♀, pièces buccales; G. galéa.

sexuel semblable dans la pilosité et la couleur des ailes existe chez d'autres espèces, *isis* de B., en particulier. Abdomen sans bandess de pruinosité.

Les palpes sont allongés, comme chez la ♀ (fig. 2). La langue, lorsqu'elle est étendue, atteint une longueur égale à celle du tibia 3 augmentée des 3 articles suivants du tarse ; elle est profondément bifide à l'extrémité (fig, 1). Clypéus assez fortement proéminent, sans incision médiane au bord antérieur. La distance interoculaire égale les 2 premiers articles du funicule réunis. Echancrure basale des fémurs antérieurs très peu profonde ; les épines du peigne sont courtes : celles qui sont à l'extrémité du 2e article n'atteignent pas tout à fait l'apex du 3e article.

Armature génitale : Face dorsale de la volsella régulièrement arquée ; les soies sont peu sinueuses (fig. 16).

T. longipalpis est une espèce bien caractérisée par la structure de ses pièces buccales ; l'absence de pruinosité argentée sur l'abdomen lui donne un aspect caractéristique. J'ai étudié 6 ♂♂ et une ♀, tous de provenance égyptienne.

Tachysphex palopterus Dahlb.

♂. 6-9 mm. Le premier, les 2 premiers ou les 3 premiers segments abdominaux rouges. Clypéus parfois de cette couleur. Tibias, tarses et une partie plus ou moins grande des fémurs, rouges. Ailes presque hyalines. Pilosité de la face dorée ; celle du thorax est fine, laissant partout voir la sculpture des téguments. Des bandes de pruinosité argentée peu développées à l'extrémité des 3 premiers tergites.

Le clypéus ressemble à celui de *panzeri*, mais est un peu plus court. La distancec interoculaire égale la longueur des 2 premiers articles du funicule. Les faces latérales du propodéum ne sont pas striées ; sa face postérieure est très indistinctement striée, presque lisse. Peigne du tarse antérieur moyennement développé ; les épines situées à l'extrémité du 2e article n'atteignent pas toujours, mais dépassent parfois légèrement l'apex du 3e article.

Armature génitale : La figure 19 représente la volsella de l'exemplaire type. Chez la plupart des autres spécimens examinés, l'appendice dorsal était plus large et moins allongé, mais toujours disposé obliquement, à côtés parallèles ou faiblement convergents vers l'extrémité. Les soies sont toujours nombreuses, droites, et terminées par un petit bouton.

♀. Je ne l'ai pas reconnue avec certitude ; on peut y rapporter avec doute des spécimens qui ressemblent à *panzeri*, mais s'en distinguent par l'aire pygidiale plus mate et le clypéus plus court.

Sans l'étude de l'armature génitale, le ♂ de cette espèce ne peut être distingué de façon certaine des espèces voisines. S'il n'avait pas été décrit précédemment, je l'aurais sans doute placé parmi les espèces demandant un complément d'enquête.

J'ai étudié le type de cette espèce, figurant dans la collection Hedenborg; le peigne de son tarse antérieur est moins développé que chez les 8 autres ♂♂ que j'ai vus d'Egypte; 3 individus de Tunisie et de Biskra se rattachent très probablement à cette espèce.

Tachysphex pygidialis Kohl

Cette espèce, répandue dans une grande partie de la région paléarctique, y forme des sous-espèces géographiques assez nettement distinctes, mais qui ont toutes en commun la structure du clypéus de la ♀ et celle de l'armature génitale du ♂. La forme typique se rencontre dans le sud de l'Europe et dans une partie de l'Afrique du Nord; la ssp. *rufiventralis* Ferton, en Corse; la ssp. *algira* Kohl dans certaines régions de l'Algérie; la ssp. *gracilitarsis* Saund. à Biskra; en Egypte, on rencontre la ssp. *nattereri* Kohl, dont je donne ci-dessous la description.

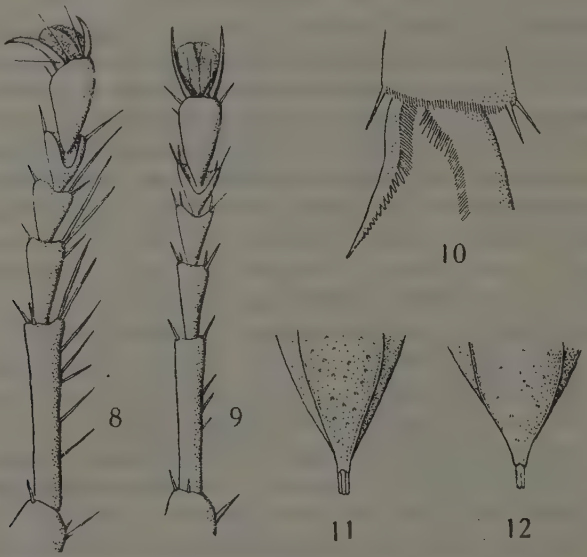
♀. 9-12 mm. Sont rouges : Le clypéus, les scapes, les tubercules huméraux, l'abdomen, les pattes et parfois des zônes sur le thorax et le propodéum. Ailes légèrement teintées de jaunâtre. La pilosité argentée de la face, du thorax et du propodéum est courte, mais assez dense pour cacher la sculpture des téguments chez les spécimens tout à fait frais. Des bandes de pruinosité très peu développées sur les tergites 1-4 ou 1-5.

Le bord antérieur du clypéus, montre de chaque côté, près de ses angles latéraux, un petit décrochement caractéristique (fig. 4), mais qui disparaît chez les individus usés; chez les espèces voisines, le bord antérieur du clypéus est simplement sinué à cet endroit. Le 2e article du funicule est 2 1/2 à 3 fois aussi long que large à l'extrémité. La distance interoculaire est à peine plus grande que le 2e article du funicule. Tempes un peu plus développées que chez *panzeri*. Sculpture du thorax et du propodéum comme chez cette espèce; les faces latérales du propodéum ne sont pas striées. Aire pygidiale plus large que chez *panzeri*, brillante, avec quelques petits points épars (fig. 12). Fémurs moins épais que chez *panzeri;* premier article du tarse postérieur, avec une ou deux épines sur sa face supérieure; le 2e article est 2 1/2 fois aussi long que large à l'extrémité.

♂. 7-9 mm. Coloration rouge moins étendue que chez la ♀; l'extrémité de l'abdomen et une partie des fémurs sont noirs. Pilosité de la face dorée; celle du thorax plus fine que chez la ♀; des bandes de pruinosité peu développées aux 3 premiers tergites.

Clypéus semblable à celui de *panzeri*. La distance interoculaire égale la longueur des 2 premiers articles du funicule; elle est parfois un peu plus courte. Sculpture comme chez la ♀. Le peigne du tarse antérieur est tout à fait rudimentaire; les épines externes de l'extrémité des articles sont parfois un peu plus longues que les épines internes, mais celles qui se trouvent à l'extrémité du 2e article atteignent tout au plus l'apex du 3e (fig. 9).

Armature génitale : La volsella est nettement caractérisée par l'appendice dorsal, de forme un peu variable, mais toujours pointu à l'extrémité (fig. 17).



Tachysphex du groupe de *panzeri*

Fig. 8 : *T. panzeri* ♂, tarse antérieur. — Fig. 9 : *T. pygidialis* ♂, id. — Fig. 10 : *T. micans* ♀, éperons postérieurs. — Fig. 11 : *T. panzeri* ♀, aire pygidiale. — Fig. 12 : *T. pygidialis* ♀, id.

La ♀ de *pygidialis* est caractérisée par la forme de son clypéus et de son aire pygidiale. Le ♂ se distingue de plusieurs espèces par la brièveté des épines de son tarse antérieur, mais l'examen de l'armature génitale est parfois nécessaire pour l'identifier avec certitude.

J'ai pu examiner les types de *nattereri*, conservés au Muséum de Vienne. La ♀ a d'assez grandes zones teintées de rouge sur le thorax et le propodéum. Quant au ♂, il appartient à *palopterus* Dahlb. La sous-espèce *nattereri* de *pygidialis*, qui se distingue de la forme typique par sa coloration rouge plus étendue, sa pilosité plus développée, ses tempes un peu plus étroites et l'absence constante de stries aux côtés du propodéum, semble propre à l'Egypte et au Soudan.

Tachysphex gracilicornis Mercet
(= ! eduardi Saund.)

♀. 11-13 mm. Les 3 premiers segments abdominaux rouges ; le 6e presque toujours rouge ou jaunâtre. Tibias et tarses de la première paire plus ou moins rouges, ceux des autres paires parfois en partie rouges. Ailes antérieures fortement enfumées, les postérieures plus hyalines. Pilosité très peu développée, laissant voir la sculpture, même sur la face. Pas de bandes de pruinosité argentée sur l'abdomen.

Bord antérieur du clypéus comme chez *panzeri*. Antennes longues et fines, le 2e article du funicule au moins 3 1/2 fois aussi long que large à l'extrémité. Distance interoculaire un peu plus courte que le 2e article du funicule. Tempes moins développées que chez *pygidialis*. Les côtés du thorax sont plus mats que chez cette dernière espèce ; faces latérales du propodéum avec de fines stries obliques sur une grande partie de leur surface. L'aire pygidiale est brillante, un peu plus étroite que chez *pygidialis*. Pattes comme chez cette espèce.

♂. 8-10 mm. Coloration comme chez la ♀. Ailes antérieures moins enfumées, surtout chez les individus de petite taille ; ces derniers ont parfois la pilosité de la face un peu argentée dans le bas, tandis qu'elle est généralement entièrement dorée. Pas de bandes de pruinosité à l'abdomen.

La distance interoculaire égale la longueur du 2e article du funicule ou à peine plus. Côtés du propodéum souvent dépourvus de stries. Le peigne du tarse antérieur est rudimentaire, comme chez *pygidialis*.

Armature génitale : L'appendice dorsal de la volsella est élargi à l'extrémité ; les soies sont fines et peu sinueuses ; quelques unes peuvent être terminées par un petit bouton (fig. 22).

La ♀ de *gracilicornis* se reconnaît à ses ailes enfumées. Les ♂♂ de petite taille, chez qui ce caractère est peu marqué, sont difficiles à distinguer de ceux de *pygidialis* et l'étude de l'armature génitale est parfois nécessaire. On remarquera cependant que, chez *gracilicornis*, les articles du funicule sont plus longs et les pattes généralement plus foncées que chez *pygidialis*.

Cette espèce est surtout propre à l'Algérie et au Maroc et je n'ai vu qu'un ♂ de provenance égyptienne que je puisse y attribuer. *T. eduardi* Saund., dont j'ai examiné des co-types, est sans doute synonyme de *gracilicornis*.

Tachysphex chephren de Beaumont

♀. 11-13 mm. Corps noir, parfois avec de faibles reflets rougeâtres à l'abdomen ; pattes noires, les tibias et les tarses, surtout ceux de la 1ère paire, plus ou moins ferrugineux ; épines des pattes et peigne noirs. Ailes antérieures nettement enfumées, un peu plus claires à la base, avec des nervures brunes; ailes postérieures plus claires. Pilosité de la face argentée, fine, laissant voir la sculpture du front; sur le thorax aussi, la pilosité est peu développée, ne cachant nulle part les téguments. Des bandes de pruinosité sur les 3 premiers tergites.

Bord antérieur du clypéus comme chez *panzeri;* articles du funicule allongés, le 2e au moins 4 fois plus long que large à l'extrémité. Front à ponctuation très fine et serrée. Distance interoculaire nettement plus courte que le 2e article du funicule. Tempes peu développées. Mésonotum et scutellum assez brillants, avec une ponctuation excessivement fine; côtés du thorax et du propodéum microscopiquement chagrinés, mats. Abdomen plus étroit que chez les autres espèces du groupe; aire pygidiale comme chez *panzeri*, mais plus brillante. Pattes grêles, le 2e articlce du tarse postérieur 3 1/2 fois aussi long que large à l'extrémité.

♂. 8-1 mm. Coloration comme chez la ♀, mais les tibias 2 et 3, parfois aussi ceux de la première paire, sont noirs. Ailes enfumées comme chez la ♀, parfois un peu moins chez les petits spécimens. La pilosité de la face est argentée dans le bas, dorée dans le haut. Les 3 premiers tergites portent de faibles bandes de pruinosité argentée.

La distance interoculaire égale la longueur du 2e article du funicule. A un fort grossissement, la ponctuation du mésonotum apparaît très fine, indistincte et espacée. Echancrure à la base des fémurs antérieurs très accusée. Il n'y a pas de peigne au tarse antérieur, les épines externes et internes de l'extrémité des articles étant de même longueur.

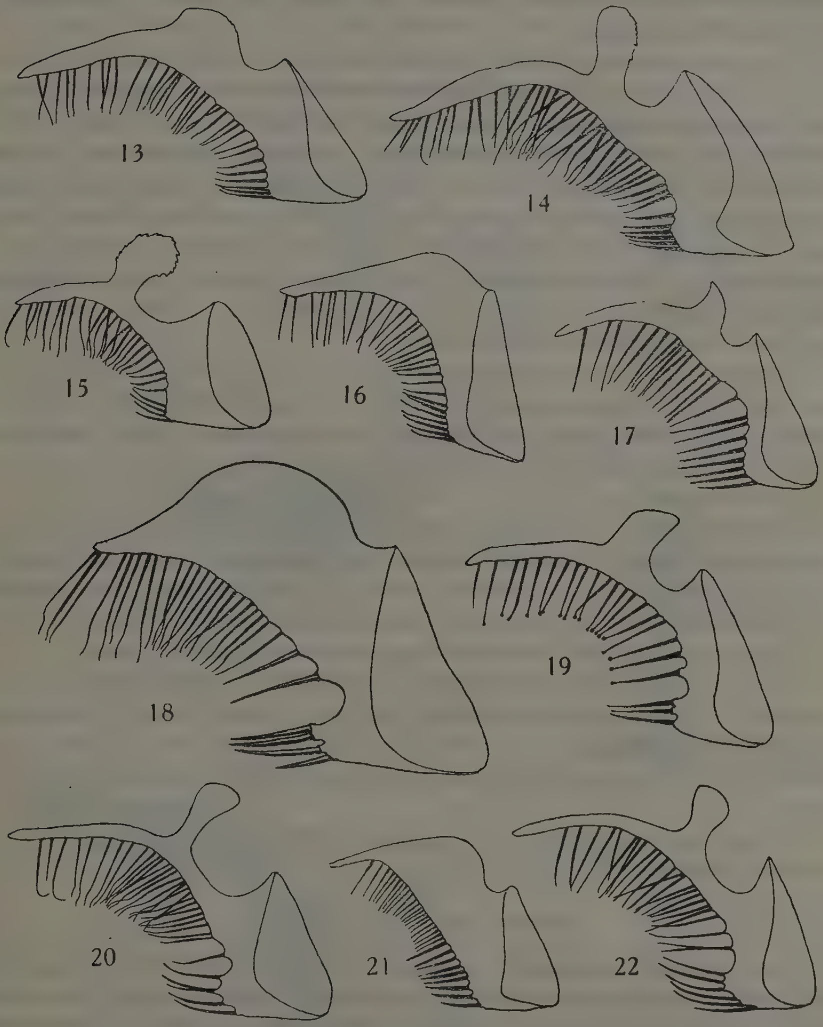
Armature génitale : La volsella est très semblable à celle de *gracilicornis* (fig. 20), mais de proportions plus grêles.

T. chephren, par ses ailes enfumées, l'absence de peigne et l'armature génitale du ♂, est très voisin de *gracilicornis*. Il s'en distingue cependant par son abdomen noir (mais ce caractère n'est peut être pas constant), ses formes plus élancées, ses pattes plus grêles, la ponctuation beaucoup plus fine du mésonotum et du scutellum, la présence de bandes de pruinosité à l'abdomen. Il est voisin aussi de *notogoniaeformis* Nadig, du Maroc et du Sud-algérien dont le ♂ seul est connu, mais s'en distingue par la ponctuation plus espacée du mésonotum, les pattes plus grêles, l'échancrure des fémurs antérieurs plus forte et la forme de l'armature.

J'ai étudié 5 ♂♂ et 2 ♀♀ provenant tous d'Egypte.

Tachysphex mycerinus de Beaumont

♀. 7-9 mm. Clypéus jaunâtre; abdomen et pattes, sauf parfois leur base, rouges. Ailes hyalines. La pilosité couchée de la face est argentée ou un peu jaunâtre, cachant la sculpture; sur le thorax, la pilosité, gris-jaunâ-



Tachysphex du groupe de *panzeri* ; volsella

Fig. 13 : *T. panzeri.* — Fig. 14 : *T. cheops.* — Fig. 15 : *T. micans.* — Fig. 16 : *T. longipalpis.* — Fig. 17 : *T. pygidialis.* — Fig. 18 : *T. buyssoni.* — Fig. 19 : *T. palopterus.* — Fig. 20 : *T. chephren.* — Fig. 21 : *T. mycerinus.* — Fig. 22 : *T. gracilicornis.*

tre, cache aussi la sculpture des téguments chez les individus frais. La pruinosité de l'abdomen est jaunâtre et forme des bandes peu nettes à l'extrémité des tergites.

Clypéus nettement bombé, comme chez les autres espèces du groupe, mais sans échancrure au milieu de son bord antérieur. Antennes assez courtes, le 2e article du funicule environ 2 1/2 fois aussi long que large à l'extrémité. La distance interoculaire égale presque la longueur des 2 premiers articles du funicule. Tempes très peu développées. Mésonotum assez brillant, avec une ponctuation très fine. Propodéum microscopiquement chagriné, demi-mat. L'aire pygidiale est large, très brillante, bombée transversalement et longitudinalement. Pattes moins grêles que chez les autres espèces du groupe ; le 2e article du tarse postérieur est à peine plus de 2 fois plus long que large à l'extrémité.

♂. 5-8 mm. Coloration comme chez la ♀, mais l'extrémité de l'abdomen est la plus grande partie des fémurs sont noirs. Pilosité de la face argentée dans le bas, dorée dans le haut ; celle du thorax, moins dense que chez la ♀, laisse apercevoir les téguments ; des bandes de pruinosité aux 3 premiers tergites.

Bord antérieur du clypéus proéminent au milieu, sans échancrure. La distance interoculaire égale la longueur des 2 premiers articles du funicule ou un peu plus. Les tarses antérieurs portent un peigne comme chez *panzeri*.

Armature génitale : La volsella ressemble à celle de *longipalpis* (fig. 21), mais ses soies sont plus courtes et manquent dans la partie apicale.

La ♀ de *mycerinus* est caractérisée par ses formes ramassées, ses pattes courtes, la forme de son aire pygidiale et de son clypéus. Le ♂, par contre est difficile à distinguer de diverses formes voisines et, dans ccertains cas l'étude de l'armature génitale seule permettra de le déterminer avec certitude.

J'ai étudié 4 ♂♂ et 7 ♀♀ provenant d'Egypte, ainsi qu'un couple de Tunisie (Tozeur).

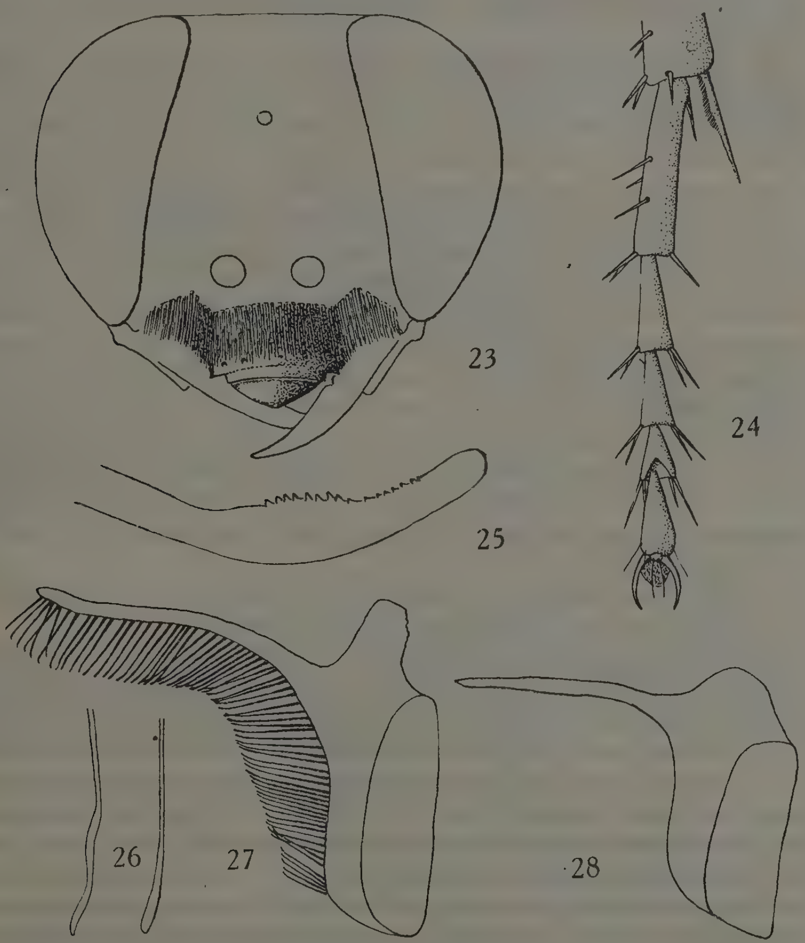
GROUPE DE *LUXURIOSUS*

Les espèces appartenant à ce groupe se distinguent de celles du groupe de *panzeri*, avec lesquelles elles ont en commun la structure des pièces buccales, par divers caractères. La distance interoculaire est toujours beaucoup plus grande ; la tête, vue de face, apparaît de ce fait plus large. La sculpture des téguments est plus forte : le mésonotum est le scutellum sont distinctement ponctués sur un fond brillant ; la face dorsale du propodéum est plus irrégulièrement chagrinée. Chez la ♀, l'extrémité des tibias antérieurs porte à son angle inféro-externe, deux épines de longueur inégale et le métatarse postérieur montre deux épines sur sa face dorsale. Mais la principale caractéristique du groupe, qui ne se retrouve chez aucun autre *Tachysphex* paléarctique, est l'absence d'échancrure à la base des fémurs antérieurs du ♂.

Dans ce groupe aussi, certains spécimens n'ont pu jusqu'à présent être déterminés avec certitude.

Tachysphex luxuriosus Morice

♀. 10-13 mm. Noire ; les mandibules, sauf leur apex, le clypéus, les scapes, les tubercules huméraux, l'abdomen et les pattes rouges ; fémurs



Tachysphex du groupe de *luxuriosus*

Fig. 23 : *T. luxuriosus* ♀, tête, vue de face. — Fig. 24 : id., patte postérieure. — Fig. 25 : id., crochet de l'armature génitale. — Fig. 26 : id., soies de la volsella. — Fig. 27 : id., volsella. — Fig. 28 : *T. horus*, volsella (les soies n'ont pas été figurées).

antérieurs parfois un peu obscurcis. Chez un spécimen, les téguments étaient entièrement ferrugineux, sauf les parties supérieure et postérieure de la tête. Chez les individus frais, la tête, le thorax et le propodéum sont recouverts d'une pilosité pas très régulièrement couchée, argentée, ou plus ou moins jaunâtre sur le vertex et la face dorsale du thorax ; cette pilosité cache complètement les téguments. Les 5 premiers tergites sont densément recouverts de pruinosité argentée assez longue, formant des bandes sous certains éclairages. Hanches, trochanters et fémurs à pilosité argentée couchée assez dense.

Le clypéus est fortement bombé ; sa partie apicale est brillante, mais ponctuée ; la lamelle est tronquée en avant, avec un décrochement très net près des angles latéraux (fig. 23). 2e et 3e articles du funicule d'égale longueur, 3 frois plus longs que larges à l'extrémité. Le vertex, vu de face, est rectiligne (fig. 23) ; il montre une ponctuation assez fine et dense ; distance interoculaire très grande, égalant au moins la longueur des articcles 2 et 3 du funicule réunis, parfois même presque la longueur des 3 premiers articles. Tempes relativement peu développées, comme chez *panzeri*. Mésonotum et scutellum brillants, à ponctuation assez fine et pas très serrée, les espaces par endroits plus grands que les points. Face dorsale du propodéum mate, finement chagrinée, avec des stries longitudinales irrégulières ; les faces latérales ne semblent pas striées. Dernier segment assez fortement déprimé · l'aire pygidiale est très brillante, avec des points isolés, peu nettement bordée sur ses côtés. Pattes assez élancées et moyennement épineuses ; le métatarse postérieur porte quelques longues épines ; avant dernier article des tarses nettement plus long que large, mais peu échancré, sur moins de la moitié de sa longueur (fig. 24).

♂. 8-10 mm. Coloration et pilosité comme chez la ♀, mais les pattes et les derniers segments abdominaux parfois obscurcis.

Le clypéus ressemble à celui de la ♀, mais ne montre pas les petits décrochements latéraux du bord antérieur. 2e et 3e articles du funicule égaux, 2 1/2 fois aussi longs que larges. La distance interoculaire est plus grande que la longueur des 3 premiers articles du funicule. Sculpture comme chez la ♀. Le dernier tergite est assez grand, demi-mat, ponctué, assez largement tronqué ou même un peu échancré à l'extrémité. Fémurs antérieurs sans trace d'échancrure basale. Tarse antérieur sans véritable peigne, avec une seule épine à l'extrémité du 2e article.

Armature génitale : la volsella est allongée, avec un appendice dorsal vertical et situé très près de la base ; les soies sont élargies dans leur partie terminale. Tête des crochets allongée (figs. 25 à 27).

T. luxuriosus se reconnaît aux particularités propres au groupe : clypéus et pièces buccales comme chez les espèces du groupe *panzeri*, mais vertex très large ; absence d'échancrure aux fémurs antérieurs du ♂. Elle est très voisine de la suivante.

J'ai étudié le type (♀) de cectte espèce, ainsi que 7 ♂♂ et 10 ♀♀ de Basse Egypte et du désert nubique.

Tachysphex horus de Beaumont

♀. 8-12 mm. Noire ; les mandibules, sauf leur apex, souvent le bord antérieur du clypéus et l'extrémité des scapes, en général les 3 premiers segments abdominaux, les genoux, tibias et tarses rouges. Quelques individus, à abdomen et tibias en grande partie obscurcis, appartiennent probablement aussi à cette espèce. Pilosité un peu moins développée que chez *luxuriosus* ; c'est ainsi que, sur le vertex, elle est plus dressée et, même chez les individus frais, ne cache pas la sculpture.

Morphologiquement, cette espèce est presque identique à la précédente ; les côtés du propodéum semblent être en général finement striés, mais ce caractère est difficile à voir sous la pilosité ; le dernier segment abdominal est moins déprimé et l'aire pygidiale plus distincte.

♂. 8-10 mm. Coloration et pilosité comme chez la ♀.

Les premiers articles du funicule sont plus courts que chez *luxuriosus*, à peu près 2 fois aussi longs que larges ; la distance interoculaire peut atteindre la longueur des 4 premiers articles du funicule. Les tarses antérieurs presentent un peigne nettement plus développé que chez l'espèce précédente : le 2e article porte 2 épines apicales qui dépassent l'apex du 3e article.

Armature génitale : L'appendice dorsal de la volsella est beaucoup moins développé que chez *luxuriosus* (fig. 28).

T. horus est très voisin de l'espèce précédente et ne s'en distingue, outre la coloration rouge et la pilosité moins développées, que par d'assez minimes caractères morphologiques. Je ne suis d'ailleurs pas absolument certain d'avoir correctement associé les 2 sexes de cette espèce, dont j'ai étudié 10 ♂♂ et 9 ♀♀ de Basse Egypte et du désert nubique, ainsi qu'un ♂ de Lybie (Gialo).

GROUPE DE *FLUCTUATUS*

Le groupe de *fluctuatus* présente avec les 4 groupes suivants (*isis*, *albocinctus*, *schmiedeknechti* et *julliani*) des liens de parenté évidents. Les espèces qui les composent se distinguent de celles des 2 groupes précédents par la structure de leurs pièces buccales : le labre est en forme de lame verticale, dont l'extrême bord seul apparaît en avant du clypéus ; la galéa des maxilles est plus courte que le scape (fig. 30). Le clypéus est peu bombé. Le vertex est toujours étroit, les tempes peu développées, souvent presque absentes dans le haut. Propodéum relativement court, tronqué en arrière, souvent presque perpendiculairement ; la fossette de sa face postérieure est peu profonde. Le 5e tergite de la ♀ présente toujours une dépression terminale brillante, bien limitée, élargie au milieu et bordée de soies isolées. Les pattes sont assez fortement épineuses : chez la ♀, l'extrémité des tibias antérieurs porte à son angle inféro-externe deux longues épines ; le métatarse antérieur montre quelques épines sur sa face supérieure, en dessus des épines du peigne, qui sont fines et nombreuses ; il y a généralement 2 fortes épines sur la face supérieure du métatarse postérieur. Ces diverses épines sont parfois moins développées chez les espèces de petite taille.

Le groupe de *fluctuatus* lui même est caractérisé principalement par la structure des sternites abdominaux. Chez les 2 sexes, le 1er sternite présente une carène longitudinale très nette et le 2e montre à sa base une petite plateforme surélevée, souvent cachée par le bord du segment précédent (fig. 29). Chez le ♂, les sternites, surtout les 3e, 4e et 5e, sont garnis à l'extrémité d'une zone de pilosité couchée, plus ou moins dense selon les espèces.

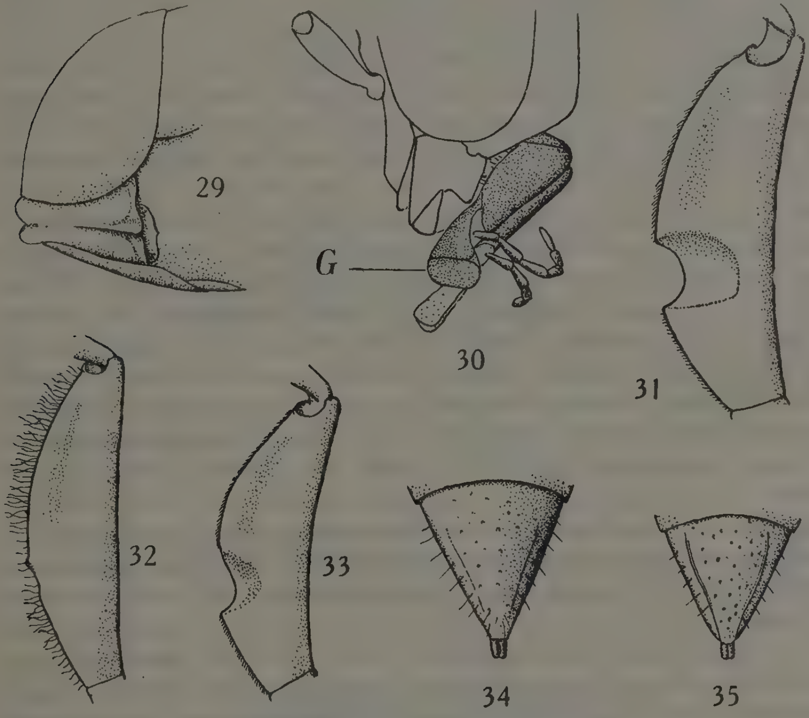
La cellule anale de l'aile postérieure est large à l'extrémité et fermée par une nervure oblique et plus ou moins arquée. Cellule radiale de l'aile antérieure étroite à l'extrémité, la 3e cubitale nettement étirée. Téguments de la tête et du thorax mats, en général très finement ponctués.

L'armature génitale est très homogène dans tout le groupe et ne permet pas, étant donné sa variation individuelle, de reconnaître à coup sûr les diverses espèces. La volsella présente toujours un appendice dorsal ; elle est garnie de soies nombreuses, simples à l'extrémité ; crochets avec des dents serrées près de l'extrémité.

Tachysphex mantivorus de Beaumont
(= ! fluctuatus Kohl. nec. Gerst., ! heliopolites Morice ♀ nec ♂)

♀. 9-14 mm. Abdomen noir ; une partie des mandibules, les tibias et les tarses et des zones plus ou moins étendues sur les fémurs, ferrugineux. Ailes hyalines. Face et clypéus recouverts d'une pilosité argentée couchée dense ; la pilosité du thorax est blanchâtre, couchée, peu dense, laissant voir la sculpture, souvent avec une zone un peu plus argentée et plus dense aux mésopleures ; pilosité du propodéum dressée, peu dense. Abdomen sans longs poils, avec une fine pruinosité argentée sur les 4 premiers tergites où elle forme des bandes apicales. Face inférieure des fémurs 1 et 2 à pilosité argentée couchée, sans poils dressés.

Bord antérieur du clypéus tronqué droit, avec une petite échancrure médiane ; aire apicale peu développée. 2e et 3e articles du funicule à peu près de même longueur, 2 fois plus longs que larges. Face régulièrement et assez fortement bombée au dessus de l'insertion des antennes, finement et densément ponctuée. Vertex mat et finement ponctué ; la distance interoculaire égale à peu près la longueur des 2 premiers articles du funicule, un peu plus chez les petits spécimens, un peu moins chez les grands. Tempes presque absentes dans le haut. Mésonotum plus ou moins brillant, à ponctuation fine, de densité un peu variable selon les individus ; scutellum à ponctuation plus espacée ; mésopleures mates dans le haut, plus brillantes, et avec une ponctuation indistincte, dans le bas. Propodéum plus ou moins grossièrement et irrégulièrement chagriné sur sa face dorsale, strié sur ses faces latérales et postérieure. Premier et 2e sternites présentant nettement les caractéristiques du groupe (fig. 29). Aire-pygidiale assez fortemetn bombée et peu nettement limitée, brillante, avec quelques points (fig. 34). Pattes robustes ; avant-



Tachysphex du groupe de *fluctuatus*

Fig. 29 : *T. mantivorus*, premiers sternites. — Fig. 30 : *T. costai*, pièces buccales; G. galéa. — Fig. 31 : *T. grandissimus* ♂, fémur antérieur, face interne. — Fig. 32 : *T. maidli*, id. — Fig. 33 : *T. mantivorus*, id. — Fig. 34 : *T. mantivorus* ♀, aire pygidiale. — Fig. 35 : *T. costai*, id.

dernier artricle des tarses postérieurs plus long que large, échancré sur la moitié de sa longueur.

♂. 6-11 mm. Coloration comme chez la ♀, mais la couleur ferrugineuse souvent moins étendue sur les pattes. Pillosité couchée de la face et du clypéus dense et dorée, parfois un peu argentée chez les petits spécimens. Pilosité du thorax et des pattes comme chez la ♀, mais plus rare. De faibles bandes de pruinosité à l'extrémité des 3 premiers tergites.

Clypéus sans aire apicale brillante nettement définie ; la lamelle, limitée par un sillon, est faiblement arquée en avant. 2e article du funicule à peu près égal au 3e, 2 fois plus long que large. Face bombée comme chez la ♀. La distance interoculaire est variable ; plus courte que le 2e article du funicule chez les petits individus, elle égale la longueur des 2 premiers articles chez les grands sprcimens ; même en valeur absolue, elle est plus courte chez les grands mâles que chez les petits. Le mésonotum est en général plus mat que chez la ♀, la sculpture du propodéum plus fine ; la striation des faces latérales du propodéum disparaît chez les petits exemplaires. Les sternites, à partir du 2e, portent au milieu de leur bord postérieur une pilosité très dense, brune, assez courte, visible surtout en examinant l'insecte de profil ; ces touffes sont surtout développées sur les 3e et 4e sternites. Echancrure du fémur antérieur bien marquée (fig. 33) ; tarses antérieurs sans peigne, le 2e article ne portant à l'extrémité, sur son côté externe, qu'une seule épine courte.

La taille et la densité de la ponctuation sont assez variables chez *mantivorus*, mais l'on reconnaîtra facilement l'espèce aux caractères généraux du groupe et on la distinguera des espèces suivantes aux caractères indiqués à celles-ci.

L'examen du type de *fluctuatus* Gerst., décrit du Mozambique, m'a montré que l'espèce méditerranéenne à laquelle Kohl et d'autres auteurs avaient donné ce nom est spécifiquement distincte et doit porter un autre nom. On peut se demander si *T. mantivorus* est le *Lyrops erythropus* Spin. Spinola dit que la pilosité de la face est dorée et d'autre part que son spécimen est une ♀ ; ce n'est que chez certaines espèces du groupe de *panzeri* que l'on rencontre des ♀♀ à pilosité faciale dorée, mais elles ont l'abdomen en partie rouge. D'autre part, chez les ♂♂ de *mantivorus*, les fémurs sont presque entièrement noirs. Je ne connais en tous cas aucun *Tachysphex* égyptien qui corresponde exactement à la description de Spinola ; en l'absence du type, il ne m'est donc pas possible de reconnaître le *L. erythropus*.

T. mantivorus est répandu dans une grande partie de la région méditerranéenne. J'en ai étudié près de 150 exemplaires, dont 80 environ d'origine égyptienne. J'ai désigné comme type une ♀ provenant de Grèce, déterminée *fluctuatus* par Kohl (Muséum de Vienne).

Tachysphex costai Destef.

♀. 10-12 mm. Les 2 ou les 3 premiers segments abdominaux rouges, de même que les tibias et les tarses, l'apex des fémurs antérieurs et une partie plus ou moins grande des fémurs 2 et 3. Clypéus et partie inférieure de la face recouverts d'une pilosité argentée couchée dense. La pilosité du thorax est grise, argentée par endroits, à demi couchée, laissant voir la sculpture ; celle du propodéum est grise et dressée. Pas de poils dressés sur le premier tergite et sur les fémurs. La pruinosité de l'abdomen est peu développée, formant de faibles bandes à l'apex des 3 ou des 4 premiers tergites.

Bord antérieur du clypéus faiblement arqué, avec une échancrure médiane ; l'aire apicale brillante est plus développée que chez *mantivorus* Articles 2 et 3 du funicule d'égale longueur, à peu près 2 fois plus longs que larges. Face bombée, comme chez *mantivorus ;* vertex mat, avec une ponctuation fine et dense, les espaces plus petits que les points. La distance interoculaire égale la longueur des 2 premiers articles du funicule ou un peu plus. Tempes comme chez *mantivorus.* Mésonotum brillant, à ponctuation moyennement forte et dense, les espaces par endroits plus petits, à d'autres plus grands que les points ; ponctuation du scutellum plus fine et plus espacée. Face dorsale du propodéum assez grossièrement réticulée ou irrégulièrement striées longitudinalement ; les côtés et la face postérieure à striation assez régulière. Sternites comme chez *mantivorus.* Aire pygidiale moins bombée et plus distinctement bordée que chez cette espèce, ses côtés légèrement concaves en arrière (fig. 35). Tibias un peu plus épineux que chez *mantivorus.*

♂. 7-10 mm. Ne se distingue du ♂ de *mantivorus* que par la couleur rouge plus ou moins étendue sur les premiers tergites, parfois réduite à quelques traces sur le premier chez les petits exemplaires.

T. costai, mis à part la coloration de l'abdomen, est extrêmement voisin de *mantivorus* et ne s'en distingue que par les caractères indiqués ci-dessus.

Cette espèce est répandue sur le pourtour de la Méditerranée ; je n'en ai pas vu d'exemplaires d'Egypte, mais il me semble probable qu'on la rencontrera dans ce pays, puisqu'elle existe, en particulier, en Cyrénaïque. Il existe au Muséum de Genève un exemplaire de Sicile, provenant de Destefani.

Tachysphex maidli de Beaumont

♀. 10-12 mm. Abdomen noir ; les tibias et les tarses, l'apex des fémurs antérieurs et une grande partie des fémurs 2 et 3 ferrugineux. Ailes hyalines. Pilosité de la face et du clypéus argentée, couchée dans le bas, plus ou moins dressée au dessus de l'insertion des antennes. Le vertex, tout le thorax et le propodéum sont recouverts d'une pilosité grise, longue et dressée, plus dense sur le propodéum ; cette pilosité dressée se montre aussi à la base du premier tergite et sur l'arête inférieure des fèmurs 1 et 2. L'abdomen porte une pruinosité grise, à faibles reflets argentés, sur les 4 premiers tergites, où elle forme des bandes apicales peu marquées.

Le bord antérieur du clypéus est plus arqué que chez *mantivorus*, avec une échancrure médiane ; l'aire apicale est très peu développée. 2e article du funicule à peine plus court que le 3e, 2 fois aussi long que large. Face bombée comme chez *mantivorus ;* sa partie supérieure et le vertex mats, avec une ponctuation peu distincte. La distance interoculaire est plus longue que les 2 premiers articles du funicule réunis. Tempes presque absentes dans le haut. Mésonotum mat, microscopiquement chagriné, avec une ponctuation peu distincte, espacéce au milieu ; mésopleures mates, avec une ponctuation très indistincte. Propodéum plus ou moins grossièrement réticulé en dessus, ses côtés avec une striation oblique irrégulière. Sternites comme chez *mantivorus ;* l'aire pygidiale ressemble à celle de *costai*. Tibias un peu plus épineux que chez *mantivorus*.

♂. 7-11 mm. Coloration comme chez la ♀, mais les fémurs entièrement ou presque entièrement noirs ; les tibias sont parfois aussi en grande partie rembrunis. Pilosité de la face et du clypéus dorée, parfois un peu argentée dans le bas. Pilosité du reste du corps comme chez la ♀, mais un peu moins longue et un peu moins dense.

Clypéus, antennes et face comme chez *mantivorus*. La distance interoculaire égale la longueur du 2e article du funicule chez les grands spécimens, celle des articles 1 et 2 chez les plus petits. Sculpture du thorax comme chez la ♀. La pilosité, à l'extrémité des sternites, est moins développée que chez *mantivorus*. L'échancrure des fémurs antérieurs est très peu marquée (fig. 32). Les tarses antérieurs portent un peigne ; des 2 épines de l'extrémité du 2e article, l'une au moins atteint l'apex du 3e article.

T. maidli se distingue facilement de *mantivorus* par sa pilosité plus abondante (1er tergite et fémurs), la ♀ de plus par la forme de son clypéus, le ♂ par l'échancrure peu développée de son fémur antérieur et la présence d'un peigne aux tarses antérieurs.

J'ai étudié 14 ♂♂ et 4 ♀♀ de cette espèce, provenant pour la plupart d'Egypte, mais aussi de la Cyrénaïque et du Maroc.

Tachysphex sordidus Dahlb.

J'ai donné récemment (1947) une description de cette espèce, dont la présence en Egypte est problématique. On la distinguera des autres espèces du groupe à ses tempes plus développées dans le haut, surtout chez la ♀ ; celle-ci se distingue encore des deux espèces précédentes par son abdomen rougeâtre à la base, par la forme de son clypéus et de son aire pygidiale. Le ♂ est en moyenne plus grand que *mantivorus ;* sa distance interoculaire est plus faible et son peigne plus développé ; il se distingue facilement de *maidli* par l'absence de pilosité dressée aux fémurs et aux premiers tergites et par l'échancrure bien marquée de ses fémurs antérieurs.

Tachysphex grandissimus Gussakovskij

♀. 12-17 mm. Sont rouges chez les spécimens nord-africains que j'ai étudiés : les 2 premiers segments abdominaux et parfois une partie du 3e, parfois aussi une partie du propodéum, les tubercules huméraux et les pattes, sauf les hanches, les trochanters et parfois la base des femurs antérieurs. D'après Gussakovskij (1933), les exemplaires de Perse peuvent avoir encore le clypéus, les tergites 3 et 4 et le thorax rouges. Ailes hyalines. La face et le clypéus sont recouverts d'une pilosité argentée couchée très dense, cachant complètement la sculpture. Mésonotum et scutellum avec une pilosité couchée blanchâtre, ne laissant voir les téguments que sous certains angles ; sur les côtés du mésonotum et sur les mésopleures, la pilosité est encore plus dense ; sur la face dorsale du propodéum, elle est dense et dressée, tandis qu'elle est couchée sur ses faces latérales. Abdomen avec des bandes de pruinosité argentée très accusée sur les 4 premiers tergites.

Bord antérieur du clypéus faiblement et régulièrement arqué, avec une échancrure médiane à peine indiquée ; l'aire apicale est très peu développée 2e et 3e articles du funicule 3 fois plus longs que larges. Vertex mat, à ponctuation fine et dense ; la distance interoculaire égale la longueur du 2e article du funicule. Tempes très peu développées, pratiquement absentes dans le haut. Ponctuation du mésonotum très fine et très dense, sans espaces entre les points. La face dorsale du propodéum, pour autant que l'on peut la voir, réticulée ; les côtés et la face postérieure, sauf sa partie supérieure, sont striés. Sternites 1 et 2 montrant nettement les caractéristiques du groupe. Aire pygidiale plus fortement rétrécie dans sa partie postérieure que chez *costai.* Pattes comme chez les espèces précédentes.

♂. 8-13 mm. Abdomen noir ou d'un ferrugineux sombre sur les 2 premiers tergites ; tibias, tarses et parfois une partie des fémurs rouges. Pilosité couchée de la face et du clypéus dense, argentée chez les individus du nord de l'Afrique, dorée chez ceux de la Perse, d'après Gussakovskij. Pilosité du thorax un peu moins dense que chez la ♀. Des bandes de pruinosité argentée nettes aux 3 ou aux 4 premiers tergites.

Clypéus comme chez *mantivorus*, sans aire apicale nette. La distance interoculaire égale presque la longueur du 2e article du funicule chez les petits spécimens, mais n'est que de la moitié de la longueur de cet article chez les grands individus. Vertex avec une impression longitudinale plus ou moins marquée. Sculpture du thorax comme chez la ♀. Fémurs antérieurs avec une très forte échancrure (fig. 31) ; tarse antérieur avec un peigne peu développé. Les sternites portent la pilosité caractéristique des espèces de ce groupe.

Parmi les espèces du groupe de *fluctuatus*, *grandissimus* est caractérisé par sa grande taille, sa pilosité très développée, la forte pruinosité argentée de ses premiers tergites.

Je n'ai pas vu le type de cette espèce, ni même de spécimens de la Perse d'où elle a été décrite, mais la bonne description de Gussakovskij ne laisse guère de doutes sur la détermination. J'ai étudié 38 ♂♂ et 8 ♀♀, provenant pour la plupart de Basse-Egypte, quelques uns de Cyrenaïque et de Tripolitaine ; j'ai également vu un ♂ du Maroc.

Tachysphex osiris de Beaumont

♀. 11-13 mm. Chez les spécimens typiques, les téguments sont presque entièrement rouges ; ne sont noirs, autant qu'on puisse le voir sous la pilosité, que la tête, sauf la partie inférieure de la face, et le mésonotum ; la tête et le thorax peuvent cependant être noirs. Les scapes, une partie plus ou moins grande des funicules et les pattes sont rouges. Ailes tout à fait hyalines, à nervulation brun clair. La tête, le mésonotum et les mésopleures sont recouverts d'une pilosité couchée extrêmement dense, à reflets argentés intenses, cachant complètement les téguments ; seuls les ocelles apparaissent, comme de petites taches noires. La pilosité du scutellum et du propodéum est argentée, un peu moins dense, laissant apercevoir les téguments par endroits et sous certains angles. Les 4 ou les 5 premiers tergites à pruinosité argentée dense, formant des bandes visibles sous certains angles. Articles basaux des pattes à pilosité argentée.

Partie apicale brillante du clypéus très peu développée ; la lamelle, bien limitée par un sillon, est faiblement arquée en avant, avec une échancrure large et peu profonde au milieu. 2e article du funicule 2 1/4 fois aussi long que large, légèrement plus court que le 3e. Face fortement bombée en dessus de l'insertion des antennes, moins cependant que chez *isis*. La distance interoculaire est un peu plus grande que la longueur des deux premiers articles du funicule. Tempes absentes dans le haut. Scutellum brillant, à ponctuation espacée, les espaces en moyenne plus grands que les points. Face dorsale du propodéum mate, finement et irrégulièrement réticulée. Sternites 1 et 2 avec les caractères du groupe. Aire pygidiale brillante, bordée, à côtés sinués.

♂. 8-10 mm. La couleur rouge est beaucoup moins étendue que chez la ♀ ; extrémité de l'abdomen noire ; tête et thorax noirs ; pattes en partie rouges seulement. Ailes hyalines, comme chez la ♀. Face à pilosité dorée couchée dense ; chez les individus frais, le mésonotum et les mésopleures doivent aussi être recouverts de pilosité dorée couchée, mais elle était en grande partie arrachée chez les spécimens, usés, que j'ai pu voir. Propodéum à pilosité dressée jaunâtre peu abondante. Des bandes de pruinosité argentée aux 3 premiers tergites.

Clypéus à zone apicale brillante étroite, la lamelle faiblement arquée. 2e article du funicule de la longueur du 3e et, comme les suivants, 2 fois plus longs que larges. Face bombée comme chez la ♀. Vertex brillant, finement ponctué ; la distance interoculaire égale la longueur des 2 premiers articles du funicule. Mésonotum brillant, à ponctuation moyenne et assez dense, les espaces par endroits plus petits, d'autres plus grands que les points ; scutellum brillant, à ponctuation fine et très espacée ; mésopleures mates dans le haut, demi-mates et à ponctuation espacée dans le bas. Face supérieure du propodéum mate, finement et irrégulièrement réticulée, les côtés plus brillants, striés. L'extrémité des 3e, 4e et 5e sternites avec des franges de poils peu développées. Fémurs antérieurs à échancrure large et peu profonde ; tarse antérieur à peine bien développé, le 2e article avec 2 épines atteignant ou dépassant l'apex du 3e article.

La ♀ de *T. osiris*, très semblable morphologiquement aux espèces précédentes, s'en distingue par la dense vestiture argentée de sa tête et de son thorax ; elle se rapproche en celà d'*isis*. Le ♂ est surtout voisin, par sa coloration, de celui de *costai*, dont il se distingue par la présence d'un peigne, la distance interoculaire plus grande, le scutellum très brillant.

L'espèce semble nettement deserticole. J'ai étudié 4 ♂♂ et 4 ♀♀ du désert nubique : Nabardi ; Korosko to Abu Hamed (British Museum) ; 1 ♀ d'Assouan ; 1 ♀ de Cyrénaïque : Djarabub (col. v. Schulthess) et 1 ♀ du Sud-algérien : El Bioth (Muséum de Berlin). Type : 1 ♀ de Nabardi VI 08 ; allotype : 1 ♂ Korosko to Abu Hamed, Dr. Swale 1910 (au British Museum).

GROUPE D'*ISIS*

Je place à part cette espèce, bien que, par sa structure générale, elle se rapproche très étroitement des précédentes. Elle s'en distingue cependant par l'absence de carène au premier sternite et de poils à l'extrémité des sternites du ♂. ta forme générale de la volsella est un peu différente de ce que l'on voit dans le groupe de *fluctuatus*.

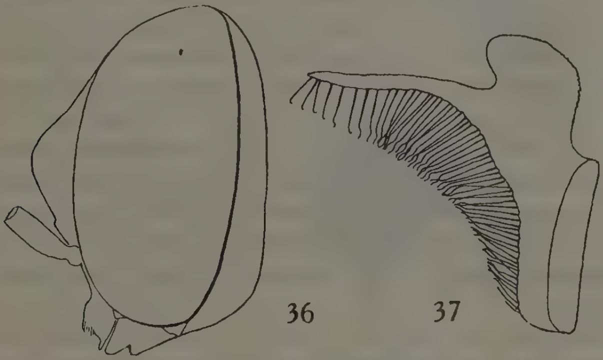
Tachysphex isis de Beaumont

♀. 11-13 mm. Les deux premiers segments abdominaux rouges, les suivants progressivement moins clairs, bruns ou ferrugineux foncé; extrémité de tous les tergites décolorée. Tibias, tarses et une partie plus ou moins grande des fémurs rouges. Ailes tout à fait hyalines, à nervures d'un brun pâle. Tête, prothorax, les 2/3 antérieurs du mésonotum et les mésopleures recouverts d'une dense pilosité couchée, avec de très vifs reflets argentés, cachant complètement la sculpture; comme chez *osiris*, à laquelle *isis* ressemble beaucocup par cette vestiture, les ocelles ressortent comme de petites taches noires. Sur la partie postérieure du mésonotum et sur le scutellum, la pilosité est un peu moins dense, légèrement jaunâtre et laissant voir les téguments sous certains angles. Le postscutellum, les côtés et la face supérieure du propodéum sont aussi recouverts d'une pilosité très dense, cachant la sculpture chez les individus frais, mais elle est ici plus longue et plus dressée, argentée sur les parties latérales, tirant sur le jaunâtre sur la face dorsale. Les 4 premiers tergites recouverts d'une pruinosité argentée formant des bandes terminales sous certains éclairages. Les articles basaux des pattes présentent aussi une nette pilosité argentée.

L'aire apicale du clypéus est un peu bombée, très brillante, avec quelques points isolés; elle est nettement limitée de la lamelle qui est faiblement arquée et qui se termine latéralement par des angles nets. 2e article du funicule 2 1/2 fois aussi long que large, un peu plus long que le 3e; ce dernier et les suivants 2 fois plus longs que larges. La face, au dessus de l'insertion des antennes, est munie d'une forte gibbosité arrondie, semblable à celle que l'on voit chez les *Prosopigastra*, mais entièrement recouverte par la pilosité (fig. 36). La distance interoculaire est un peu plus grande que la longueur des 2 premiers articles du funicule. Tempes très peu développées. Partie postérieure du mésonotum à ponctuation très fine et dense; scutellum à ponctuation très fine aussi, mais moins dense, brillant. Face dorsale du propodéum mate, finement réticulée. Aire pygidiale plane, brillante, nettement bordée, rétrécie en arrière. Sternites brillants, le 1er sans carène, le 2e sans plateforme basale. Pattes et ailes comme chez les espèces du groupe de *fluctuatus*.

♂. 9-10 mm. Coloration comme chez la ♀. Les ailes sont hyalines tout à la base et dans leur partie apicale, après les cellules; tout le reste de la surface est d'un brun-jaunâtre, avec les nervures brunes. Face à pilosité couchée dorée très dense; pro et mésothorax également avec une pilosité dorée, mais qui s'arrache très facilement. Propodéum avec une pilosité laineuse d'un brun-jaunâtre; tergites abdominaux avec une fine pruinosité argentée à reflets jaunâtres.

Clypéus avec une zone apicale brillante montrant quelques points; la lamelle est faiblement arquée. 2e articlce du funicule 2 1/4 fois aussi long que large, un peu plus long que le 3e; celui-ci et les suivants presque 2 fois plus longs que larges. Tubercule facial un peu moins accusé que chez la ♀. Vertex à ponctuation fine et dense. La distance interoculaire égale presque la longueur des 2 premiers articles du funicule. Mésonotum à ponctuation très fine et très dense, presque sans espaces entre les points ; ponctuation du scutellum un peu plus espacée ; mésopleures à ponctuation très fine aussi, très dense dans le haut. Sculpture du propodéum comme chez la ♀. Sternites brillants, sans franges de poils à l'extrémité, le premier sans carène longitudinale. Incision des fémurs antérieurs large et peu profonde ; tarses antérieurs à peigne bien développé.



Tachysphex du groupe d'*isis*

Fig. 36 : Tête de la ♀ de *T. isis*, vue de profil. — Fig. 37 : Volsella de *T. isis*.

Armature génitale : la forme de la volsella est un peu différente de ce que l'on voit dans les espèces du groupe *fluctuatus* (fig. 37).

La ♀ de cette espèce ressemble beaucoup à celle d'*osiris*, mais s'en distingue par l'absence de carène au 1er sternite, le développement du tubercule facial, la forme du clypéus. Le ♂ a, grâce à l'absence de pilosité argentée et à l'obscurcissement de ses ailes, un aspect très différent de la ♀. Il correspond cependant tout à fait à celle-ci par sa structure et sa sculpture. Ses ailes enfumées et l'absence de particularités aux sternites permettront de les distinguer des espèces du groupe de *fluctuatus*.

J'ai étudié 2 ♂♂ et 4 ♀♀ provenant des environs du Caire et 1 ♂ de Cyrénaïque.

GROUPE D'*ALBOCINCTUS*

Les espèces appartenant à ce groupe sont bien caractérisées par l'abondante pilosité laineuse qui recouvre la face et le propodéum, par la sculpture particulière de l'aire pygidiale de la ♀, par le peigne très développé dans les deux sexes et par la structure de l'armature génitale. La cellule anale de l'aile postérieure est large à l'extrémité, comme dans les 2 groupes précédents, premier sternite sans carène.

Une seule espèce a été trouvée jusqu'à présent en Egypte, mais j'en signale également une 2e que l'on a rencontrée en Cyrénaïque.

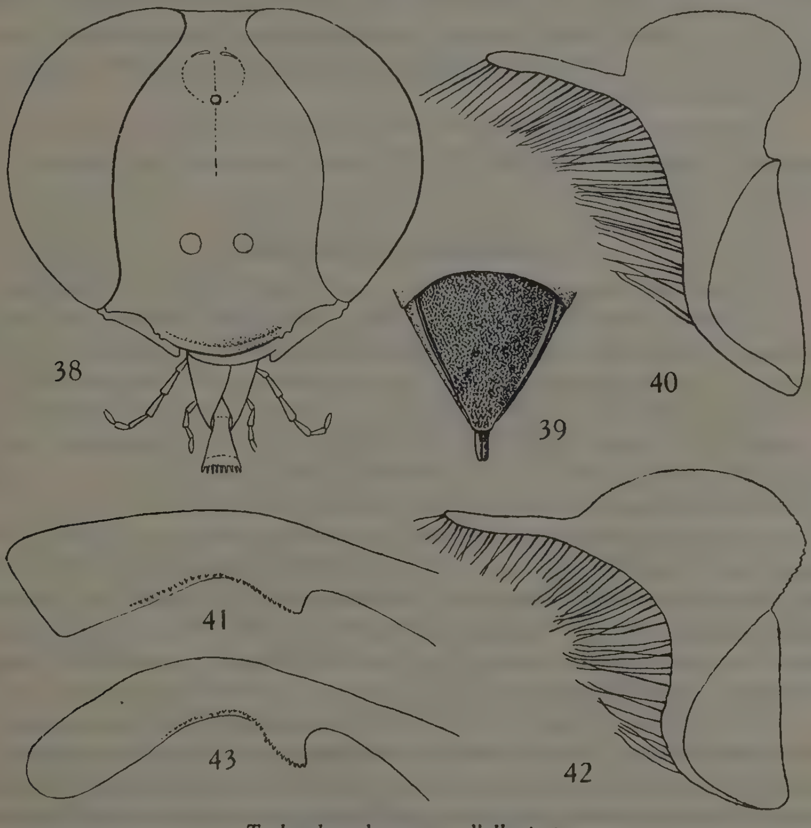
Tachysphex albocinctus Lucas
(= ! ruficrus Duf., ! syriacus Kohl, ! heliopolites Morice ♂, ! mantiraptor Fert.)

♀. 11-15 mm. Noire ; la partie médiane des mandibules et les tarses ferrugineux ; tibias noirs ou plus ou moins ferrugineux ; cette couleur peut parfois s'étendre aux fémurs et à certaines zones du propodéum. Ailes hyalines à nervures d'un brun clair. Face et clypéus recouverts d'une pilosité blanche dense, pas régulièrement couchée ; partie postérieure de la tête à pilosité blanche dressée. La pilosité du mésonotum et du scutellum est jaunâtre, couchée, ne cachant pas la sculpture, celle des mésopleures argentée et couchée. Le propodéum, chez les individus frais, montre une pilosité dressée, laineuse et dense, d'un aspect très caractéristique ; une pilosité semblable à la base du premier tergite. Les 4 premiers tergites avec des bandes apicales de pruinosité argentée. Face inférieure des fémurs antérieurs à pilosité argenté couchée.

La partie basale du clypéus montre, lorsque la pilosité est arrachée, une ponctuation fine et très serrée ; la partie apicale, seule visible chez les individus frais, est brillante et à peine ponctuée ; lamelle régulièrement arquée en avant, avec 2 petites dents sur les côtés (fig. 38). Le 2e article du funicule est un peu plus long que le 3e, 2 fois plus long que large. Face peu bombée, mate, à ponctuation fine et dense. Tubercule ocellaire à sillon longitudinal très nettement indiqué. Vertex mat, ponctué, les espaces plus grands que les points ; la distance interoculaire égale à peu près la longueur du 2e article du funicule, un peu moins chez les grands individus, un peu plus chez les petits. Tempes très peu développées. Mésonotum mat, à ponctuation très dense, sans espaces entre les points ; scutellum à ponctuation un peu plus espacée ; mésopleures mates, finement chagrinées. Face dorsale du propodéum finement chagrinée, ses faces latérales mates. Aire pygidiale large, tronquée à l'apex, nettement bordée, tout à fait mate, à sculpture granuleuse avec quelques points peu visibles (fig. 39).

♂. 8-12 mm. Coloration comme chez la ♀. La pilosité est couchée sur le clypéus, dressée sur la face, de couleur noire ou brun très foncé chez les grands spécimens, mélée de poils blancs chez les individus de taille moyenne et entièrement blanche chez les plus petits. Pilosité du reste du corps comme chez la ♀. Des bandes de pruinosité aux 3 premiers tergites.

Le clypéus est conformé comme celui de la ♀, mais sa partie mediane est un peu plus étroite et ne montre pas de dents sur les côtés du bord antérieur. 2e article du funicule à peine plus long que le 3e, 2 1/2 fois plus long que large. La distance interoculaire égale la longueur des 2 premiers articles du funicule chez les petits individus, la longueur du 2e article chez les plus grands. Sculpture comme chez la ♀. Le dernier tergite est large et aplati, mat, microscopiquement ponctué avec quelques points plus gros. L'échancrure des fémurs antérieurs est très peu profonde ; tarses antérieurs avec un peigne remarquablement développé ; fémurs 2 avec une impression à la face postérieure.



Tachysphex du groupe d'*albocinctus*

Fig. 38 : *T. albocinctus* ♀, tête vue de face. — Fig. 39 : id., aire pygidiale. — Fig. 40 : *T. albocinctus* ♂, volsella. — Fig. 41 : id., crochet. — Fig. 42 : *T. dusmeti* ♂, volsella. — Fig. 43 : id., crochet.

Armature génitale : bien caractérisée surtout par la forme des crochets (figs. 40 et 41).

T. albocinctus est bien caractérisé par une série de particularités : grande taille, pilosité, structure de l'aire pygidiale de la ♀, etc.

L'espèce a été décrite sous des noms divers. J'ai pu voir les types de *albocinctus* Luc, *ruficrus* Duf. et *mantiraptor*, déposés au Muséum de Paris, celui de *syriacus* au Muséum de Vienne, ceux d'*heliopolites* au Muséum d'Oxford. Le ♂ de cette dernière espèce est un individu de petite taille (8 mm.) à pilosité faciale blanche ; son armature génitale, préparée, s'est révélée identique à celle des *albocinctus* typiques. Quant à *heliopolites* ♀, c'est un *mantivorus* de B.

T. albocinctus est répandu dans toute la région méditerranéenne et également en Afrique. J'ai étudié plus de 50 spécimens dont une quinzaine de provenance égyptienne.

Tachysphex dusmeti Giner Mari

♀. Description abrégée, d'après Giner Mari (1934). 13 mm. Abdomen et pattes noires, les métatarses ferrugineux. Ailes hyalines dans leur partie apicale, jaunâtres dans leur moitié basale. Face et clypéus à pilosité longue et dense, argentée sur le clypéus, jaunâtre sur la tête, cachant la sculpture ; pilosité du vertex moins dense, jaunâtre. Pilosité du thorax fine et dense, jaune, plus longue sur les mésopleures ; celle du propodéum jaune et dressée, d'aspect laineux ; des poils dressés sur la base du premier tergite. Une pruinosité argentée sur les 4 premiers tergites.

Le 1/3 apical du clypéus brillant ; la lamelle est arquée en avant, sans dents près de ses angles latéraux. 2e article du funicule plus long que le 3e. La distance interoculaire est égale à la longueur du 2e article du funicule. Mésonotum et scutellum mats, à ponctuation fine et dense. Propodéum coriacé. Aire pygidiale triangulaire, large, nettement bordée, tronquée à l'apex, à ponctuation fine et dense.

♂. 10-12 mm. D'après Giner Mari, coloration comme chez la ♀. Les individus que j'ai vus avaient les tibias en partie ferrugineux foncé et parfois des zones d'un ferrugineux très foncé sur les deux premiers tergites. Ailes fortement teintées de jaune, sauf dans leur partie apicale, après les cellules, qui est hyaline. Tête avec une pilosité dressée foncée, noire d'après Giner Mari, brune ou grisâtre chez les individus, usés, que j'ai étudiés. Pilosité du thorax et du propodéum comme chez la ♀, mais plus foncée.

Clypéus comme chez *albocinctus*, mais plus fortement ponctué dans sa partie apicale. Distance interoculaire plus courte que la longueur du 2e article du funicule chez les spécimens étudiés, égale à celui-ci d'après Giner Mari. Les autres caractères externes comme chez *albocinctus*.

Armature génitale : La volsella est un peu différente de celle d'*albocinctus* ; les crochets sont plus arrondis à l'extrémité (figs. 42 et 43).

Deux ♂♂ de Gialo (Muséum de Gênes) et 1 ♂ de Tripoli (coll. von Schulthess) m'ont semblé, par la coloration jaune intense de la base des ailes, se rapporter à cette espèce, décrite d'Espagne ; il serait cependant nécessaire de vérifier cette détermination par l'examen des types de Giner Mari.

T. dusmeti est très voisin de *T. albocinctus*, mais s'en distingue, outre la coloration des ailes, par l'absence de dents latérales au bord antérieur du clypéus de la ♀ et par l'armature génitale du ♂.

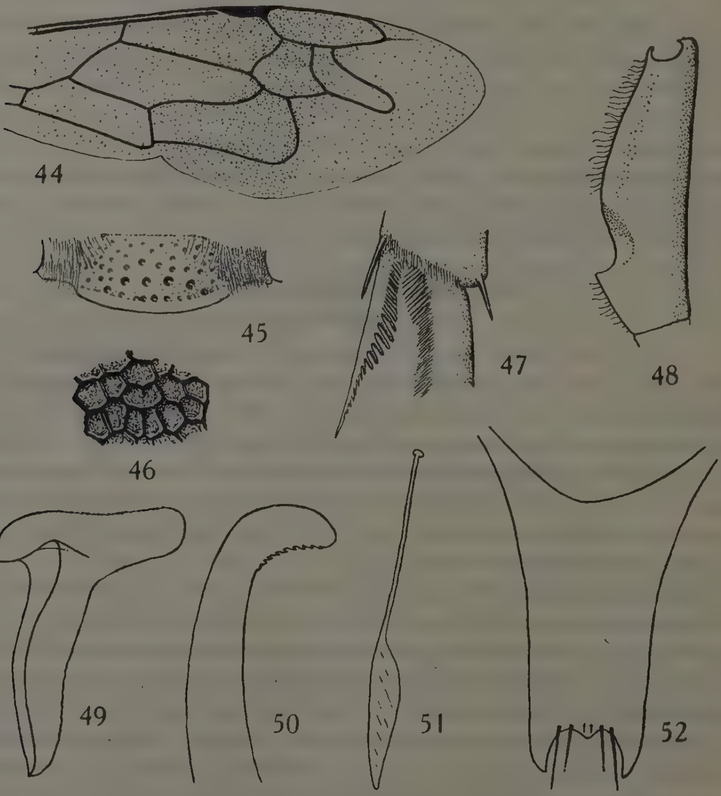
GROUPE DE *SCHMIEDEKNECHTI*

La seule espèce méditerranéenne de ce groupe présente des particularités qui la placent à part ; ce sont en particulier la sculpture du mésonotum et la structure des éperons des tibias postérieurs. L'armature génitale se rapproche, par la forme de la volsella et de ses soies, de celles des espèces appartenant au groupe suivant, mais elle présente cependant un type bien spécial. La parenté avec le groupe de *fluctuatus* se manifeste par la présence d'une obtuse carène, d'ailleurs inconstante, au premier sternite et par la cellule anale des ailes postérieures large à l'extrémité.

Tachysphex schmiedeknechti Kohl
(= ! psilopus Kohl)

♀. 9-10 mm. Corps noir ; extrémité des tarses parfois un peu ferrugineuse. Ailes avec une zone enfumée, plus ou moins visible selon les individus, avant l'apex des ailes antérieures (fig. 44). Tête, mésopleures et propodéum recouverts de longs poils blancs peu serrés ; même sur la face, ils ne sont pas complètement couchés sur les téguments et ne cachent nulle part la sculpture ; sur le mésonotum, les poils sont plus courts et bruns. Les 3 premiers tergites abdominaux recouverts d'une fine pruinosité argentée ne formant pas de bandes nettes.

Clypéus très aplati sur toute son étendue ; il n'y a pas de limite entre une aire basale et une aire apicale, toute cette zone étant brillante, avec des points irréguliers ; la lamelle est faiblement et régulièrement arquée en avant (fig. 45). Le 2e article du funicule est nettement plus long que le 3e, environ 3 fois aussi long que large ; tous les articles, à partir du 4e, sont un peu comprimés. Face mate, irrégulièrement réticulée, à ligne médiane nette. Vertex mat, un peu concave, avec une impression angulaire qui se prolonge en arrière par un fin sillon ; la distance interoculaire égale à peu près la longueur du 2e article du funicule. Tempes absentes dans le haut. Mésonotum avec une sculpture réticulée très particulière (fig. 46) ; scutellum brillant et ponctué, les espaces plus grands que les points ; mésopleures à sculpture réticulée plus fine que celle du mésonotum. Face dorsale du propodéum irrégulièrement réticulée avec parfois une tendance à une striation longitudinale ; faces latérales et postérieure finement striées. Premier sternite plus ou moins nettement caréné. Aire pygidiale moyennement large, très brillante, avec quelques points. Pattes assez grêles ; leurs épines sont fines, mais bien visibles du fait de leur couleur noire. Le plus grand éperon des tibias postérieurs porte dans sa partie apicale des dents beaucoup plus fortes que chez toutes les autres espèces (fig. 47). Avant-dernier article des tarses postérieurs nettement plus long que large, échancré sur le 1/3 de sa longueur.



Tachysphex schmiedeknechti

Fig. 44 : Aile de la ♀. — Fig. 45 : clypéus de la ♀. — Fig. 46 : sculpture du mésonotum. — Fig. 47 : éperons postérieurs. — Fig. 48 : fémur antérieur du ♂, face interne. — Fig. 49 : volsella (les soies n'ont pas été figurées). — Fig. 50 : crochet. — Fig. 51 : une soie de la volsella. — Fig. 52 : dernier sternite du ♂.

♂. 7-8 mm. Les 3 premiers segments abdominaux rouges ; une partie des mandibules et des tarses, parfois les tibias postérieurs, ferrugineux. La bande foncée des ailes est généralement mieux marquée que chez la ♀, de couleur plus ou moins rousse. Pilosité de la tête et du thorax comme chez la ♀, mais les poils de la face, au moins dans le haut, sont dorés. Pas de bandes de pruinosité argentée à l'abdomen.

Sculpture des téguments comme chez la ♀. Clypéus aplati comme dans l'autre sexe, mais moins brillant. 2e article du funicule un peu plus long que le 3e, 2 1/2 à 3 fois aussi long que large. La distance interoculaire égale la longueur du 2e article du funicule ou est un peu plus longue. Le 7e tergite est distinctement ponctué. Pattes grêles, les articles des tarses très allongés. Les fémurs antérieurs présentent une échancrure limitée à sa base par un angle très net (fig. 48). Tarse antérieur avec un peigne très développé. Eperons des tibias postérieurs comme chez la ♀.

Armature génitale : Volsella sans appendice dorsal, avec des soies plumeuses ; crochets de forme particulière ; dernier sternite avec un petit lobe au milieu de son échancrure (figs. 49 à 52).

T. schmiedeknechti est une espèce très facilement reconnaissable à une série de caractères, dont les plus frappants sont la sculpture du mésonotum, la structure des éperons postérieurs et la bande enfumée des ailes antérieures. Kohl, trompé par la différence de coloration des 2 sexes et par la provenance différente de ses individus a décrit le ♂ et la ♀ sous deux noms différents ; j'ai pu voir les types de ces deux espèces.

L'espèce est répandue dans la partie orientale du bassin méditerranéen (Grèce, Zante, Rhodes, Palestine) et dans l'Afrique du nord (Egypte, Algérie). J'ai étudié une quarantaine de spécimens, dont un certain nombre d'origine égyptienne.

GROUPE DE *JULLIANI*

Les diverses espèces de ce groupe ont un aspect extérieur très varié, mais certaines structures communes montrent cependant leur lien de parenté. C'est tout d'abord la structure de l'armature génitale : les crochets sont munis dans leur partie terminale d'une lame caractéristique ; la volsella ne montre pas d'appendice dorsal et les soies sont généralement élargies en palette à l'extrémité. Un autre caractère commun aux espèces de ce groupe est la brièveté du 6e article des palpes maxillaires, nettement plus court que le 5e. L'aire pygidiale de la ♀ présente souvent une structure particulière ; le 7e tergite du ♂ est aplati et brillant. Le 1er sternite présente chez certaines espèces un rudiment de carène longitudinale. La cellule anale des ailes postérieures est plus étroite à l'extrémité que chez les groupes précédents ; la cellule radiale de l'aile antérieure est parfois plus fortement tronquée et la 3e cubitale moins étirée.

Tachysphex julliani Kohl

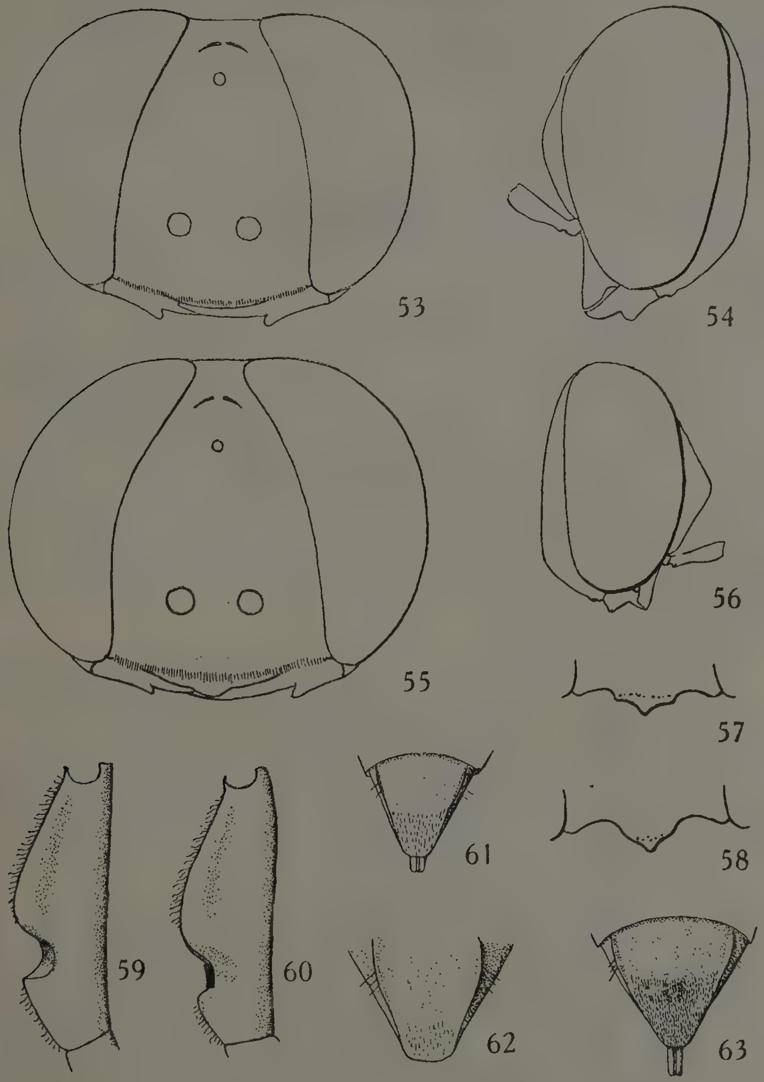
♀. 8-12 mm. L'extension de la couleur rouge est très variable. L'abdomen peut être presque entièrement de cette couleur ou, au contraire, ce qui est souvent le cas chez les exemplaires nord-africains, entièrement noir. Pattes plus ou moins rouges également. Ailes très peu enfumées. Partie inférieure de la face et clypéus à pilosité argentée pas très dense, mais cachant cependant la sculpture. Sur le thorax, la pilosité n'est pas très dense, ne cachant la sculpture que sur une partie des mésopleures; elle est jaunâtre sur le mésonotum et le scutellum, blanche ailleurs. Abdomen avec 3 bandes de pruinosité.

L'aire apicale du clypéus est nettement limitée, un peu plus courte que l'aire basale, brillante, peu ou pas ponctuée; la lamelle, chez les individus frais, est bien développée et ondulée à son bord antérieur. 2e et 3e articles du funicule d'égale longueur, 3 fois plus longs que larges. Face peu bombée, assez brillante, avec une ponctuation assez espacée au milieu. Vertex à ponctuation plus fine et plus dense. La distance interoculaire égale la longueur des 2 premiers articles du funicule chez les petits exemplaires, un peu moins chez les grands. Tempes peu développées. Mésonotum et scutellum brillants à ponctuation moyennement espacée, les espaces égaux ou plus grands que les points; mésopleures mates, finement chagrinées. Face dorsale du propodéum finement chagrinée, avec quelques stries plus fortes chez les grands spécimens; les côtés avec une striation fine et serrée, manquant chez les individus de petite taille. Premier sternite parfois indistinctement caréné sur sa ligne médiane. Aire pygidiale ressemblant à celle de l'espèce suivante, très large, largement tronquée à l'extrémité, presque imponctuée, montrant une légère dépression transversale qui sépare une aire basale plus brillante et une aire apicale plus mate; la différence de sculpture entre les deux zones est parfois peu marquée. Avant-dernier article des tarses postérieurs nettement plus long que large, échancré sur la moitié de sa longueur seulement.

♂. 6-9 mm. Coloration et pilosité comme chez la ♀.

La partie médiane du clypéus est prolongée en une petite dent triangulaire (fig. 57). 2e article du funicule un peu plus court que le 3e; ce dernier 2 fois plus long que large. Sculpture des téguments comme chez la ♀, mais la ponctuation parfois un peu plus serrée. La distance interoculaire égale à peu près la longueur des 2 premiers articles du funicule. Le dernier tergite abdominal est aplati, brillant, avec une ponctuation nette et espacée. L'échancrure des fémurs antérieurs est large et munie au fond d'une petite lamelle dressée pas toujours facile à voir (fig. 60). Tarses antérieurs avec un peigne, le 2e article avec 2 épines atteignant l'extrémité du 3e article.

Armature génitale : La volsella et les crochets montrent la forme caractéristique des espèces de ce groupe. Soies de la volsella élargies en palette (figs. 68 à 70).



Tachysphex du groupe de *julliani*

Fig. 53 : *T. vestitus* ♀, tête vue de face. — Fig. 54 : id., tête vue de profil. — Fig. 55 : *T. incanus* ♀, tête vue de face. — Fig. 56 : *T. deserticola* ♀, tête vue de profil. — Fig. 57 : *T. juliani* ♂, clypéus. — Fig. 58 : *T. abjectus* ♂, clypéus. — Fig. 59 : *T. abjectus* ♂, tibia antérieur, face interne. — Fig. 60 : *T. julliani* ♂, id. — Fig. 61 : *T. vestitus* ♀, aire pygidiale. — Fig. 62 : *T. abjectus* ♀, id. — Fig. 63 : *T. incanus* ♀, id.

La ♀ de *julliani* présente, en commun avec l'espèce suivante, une forme d'aire pygidiale qui les distinguent de toutes les autres espèces de *Tachysphex* paléarctiques. Il en est de même pour le ♂ en ce qui concerne la forme du clypéus ; la petite lamelle, au fond de l'échancrure des fémurs antérieurs, est caractéristique de l'espèce.

T. julliani est répandu sur tout le pourtour de la Méditerranée. Je n'ai vu que 2 ♂♂ d'origine égyptienne.

Tachysphex abjectus Kohl

♀. 10-12 mm. Abdomen noir ; tibias plus ou moins ferrugineux ou entièrement noirs ; tarses ferrugineux à l'extrémité. Ailes presque hyalines. Pilosité comme chez *julliani*, mais partout un peu plus dense.

Clypéus plus aplati que chez *julliani*, sans aire apicale nettement définie ; la lamelle est assez régulièrement arquée en avant. 2e article du funicule à peine plus long que le 3e, à peu près 2 fois plus long que large. Face à ponctuation un peu plus fine que chez *julliani*. Vertex mat, à ponctuation fine et dense. La distance interoculaire égale ou est un peu inférieure à la longueur du 2e article du funicule. Tempes comme chez *julliani ;* sculpture du thorax comme chez cette espèce, mais la ponctuation du mésonotum est un peu plus fine et plus espacée ; les côtés du propodéum sont brillants, sans stries. L'aire pygidiale est de forme semblable à celle de *julliani*, mais sans sillon transversal (fig. 62).

♂. 6-9 mm. Coloration et pilosité comme chez la ♀.

Le bord antérieur du clypéus est un peu différent de celui de *julliani* (fig. 58). 2e article du funicule égal au 3e, 2 fois plus long que large. La distance interoculaire égale ou surpasse légèrement la longueur des 2 premiers articles du funicule. Structure et sculpture de la tête et du thorax comme chez la ♀. 6e tergite plat, brillant et très peu ponctué. Echancrure des fémurs antérieurs plus profonde et moins large que chez *julliani*, sans lamelle (fig. 59). Pattes comme chez cette espèce.

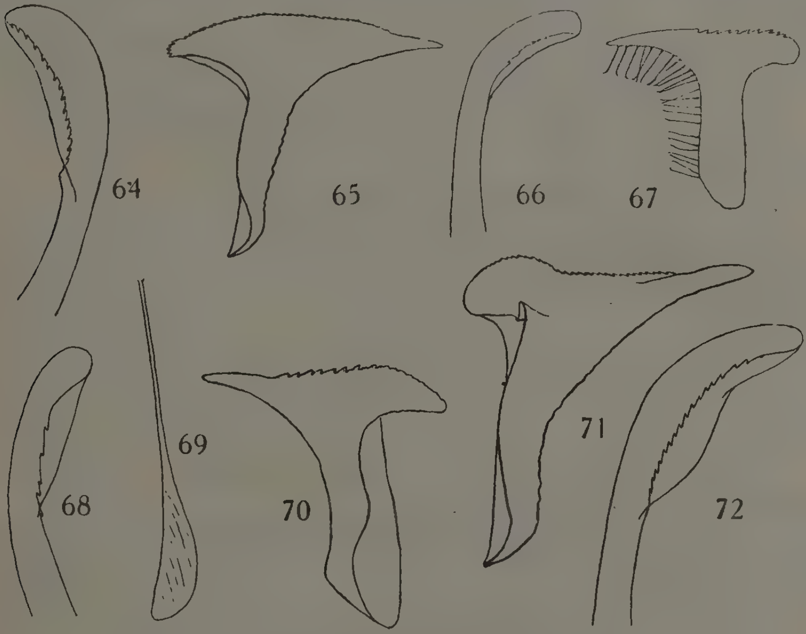
Armature génitale : la volsella est un peu surélevée à sa partie postérieure ; soies élargies en palette ; crochets à dents plus nombreuses que chez *julliani* (figs. 71 et 72).

T. abjectus pourrait facilement être confondu avec les exemplaires à abdomen noir de *julliani*. Il s'en distingue dans les 2 sexes par la mésonotum plus brillant, l'absence constante de stries aux côtés du propodéum, la ♀ de plus par le clypéus plus aplati, les premiers articles du funicule plus longs, le ♂ par la structure de ses fémurs antérieurs.

J'ai étudié 9 exemplaires de cette espèce : le type (♂) de Kohl, de Transcaspie, un autre ♂ d'Asie occidentale (voir de Beaumont 1936, 2), 4 ♂♂ et 1 ♀ de Basse Egypte et 2 ♀♀ de Biskra (Coll. Morice).

Tachysphex vestitus Kohl

♀. 8-10 mm. Abdomen et pattes, depuis les trochanters, rouge clair ; le bord antérieur du clypéus, les scapes et parfois les premiers articles du funicule sont aussi de cette couleur. Ailes entièrement hyalines. Pilosité du corps très abondante. Face et tout le clypéus recouverts d'une pilosité argentée couchée très dense, cachant complètement les téguments ; sur le tubercule ocellaire et sur le vertex, la pilosité devient jaunâtre et un peu moins dense ; tempes à pilosité argentée couchée dense. Tout le thorax et le propodéum sont recouverts d'une pilosité, pas régulièrement couchée, dense, cachant la sculpture chez les individus frais, jaunâtre sur le mésonotum et le scutellum, blanche ailleurs. Les 4 premiers tergites sont recouverts d'une pilosité couchée dense et relativement longue, formant des bandes terminales ; la plus grande partie des pattes et les 3 premiers articles des antennes portent aussi une pilosité argentée couchée.



Tachysphex du groupe de *julliani :* armatures génitales

Fig. 64 : *T. vestitus*, crochet. — Fig. 65 : id., volsella (les soies n'ont pas été figurées). — Fig. 66 : *T. deserticola*, crochet. — Fig. 67 : id., volsella. — Fig. 68 : *T. julliani*, crochet. — Fig. 69 : id., une soie de la volsella. — Fig. 70 : id., volsella (les soies n'ont pas été figurées). — Fig. 71 : *T. abjectus*, volsella (id.). — Fig. 72 : id., crochet.

Clypéus tout à fait aplati, son extrême bord seul visible, en arc peu accusé (fig. 53). 2e et 3e articles du funicule d'égale longueur, environ 3 fois aussi longs que larges. Face assez fortement bombée en dessous du tubercule ocellaire (fig. 54). Vertex mat, finement et densément ponctué ; la distance interoculaire égale la longueur des 2 premiers articles du funicule. Tempes peu développées. Mésonoum mat, à ponctuation très fine et dense ; ponctuation du scutellum un peu plus espacée. Face supérieure du propodéum finement réticulée. Aire pygidiale large et assez largement tronquée à sculpture caractéristique : sa partie antérieure est lisse et brillante, avec quelques petits points isolés ; sa partie postérieure est plus ou moins brillante aussi, mais finement et irrégulièrement striée longitudnalement ; pattes assez grêles ; tibias à épines blanches, longues et fines ; avant-dernier article des tarses beaucoup plus long que large, mais échancré sur le 1/3 de sa longueur seulement. Cellule radiale un peu plus fortement tronquée que chez les espèces précédentes.

♂. 6-8 mm. Coloration et pilosité comme chez la ♀.

Clypéus comme chez la ♀, aplati et recouvert par la pilosité, son bord antérieur faiblement arqué. 2e et 3e articles du funicule d'égale longueur, 2 1/2 fois aussi longs que larges. Forme et sculpture de la tête et du thorax comme chez la ♀. La distance interoculaire égale la longueur des articles 2 et 3 du funicule. 6e tergite aplati, brillant, avec quelques points très isolés. Echancrure des fémurs antérieurs très profonde. Tarses antérieurs avec un peigne très développé, les 2 épines du 2e article dépassant longuement l'apex du 3e article.

Armature génitale : La volsella et les soies ressemblent à celles des espèces précédentes (figs. 64 et 65).

T. vestitus se reconnaît à sa pilosité très abondante, à son clypéus très aplati, à la sculpture de l'aire pygidiale de la ♀ ; le ♂ est surtout voisin des 2 espèces suivantes.

J'ai étudié une quarantaine d'exemplaires, provenant pour la plupart de la Basse Egypte, mais aussi du désert nubique et du Sud-Algérien ; j'ai pu voir le type (♂) de Kohl, originaire de Biskra.

Tachysphex incanus de Beaumont

♀. 10 mm. Abdomen rouge, avec quelques taches noires irrégulières ; bord des tergites décoloré. Sont également rouges : le clypéus, les tubercules huméraux, les pattes, à l'exception d'une partie des hanches et des trochanters. Ailes hyalines. Face, clypéus, à l'exception de son bord antérieur, et tempes recouverts de pilosité argentée couchée dense, cachant complètement les tuguments. Pilosité du thorax comme chez *vestitus*, mais un peu moins dense. Les 4 premiers tergites avec une pruinosité argentée moins longue que chez cette espèce. Fémurs à pilosité argentée couchée assez dense.

Clypéus très plat, comme chez *vestitus*, mais le bord antérieur, brillant, dépasse la pilosité et forme un angle obtus en avant (fig. 55). 2e et 3e articles du funicule d'égale longueur, 3 1/2 fois aussi longs que larges. Face moins bombée que chez *vestitus*, comme chez *julliani*. Vertex mat, à ponctuation très fine et très dense ; la distance interoculaire égale la longueur du 2e article du funicule. Tempes très peu développées. Mésonotum et scutellum à ponctuation fine et moyennement espacée, les espaces à peu près de la grandeur des points. Face dorsale du propodéum réticulée, avec des stries longitudinales nettes chez l'un des individus. L'aire pygidiale est large, assez largement tronquée à l'extrémité ; elle est divisée en 2 zones assez nettement limitées ; l'aire basale est brillante, l'aire apicale finement striolée longitudinalement (fig. 63) (¹). Pattes comme chez l'espèce précédente.

♂ (?). 6 mm. Coloration et pilosité comme chez la ♀.

Bord antérieur du clypéus comme chez *vestitus*. 2e et 3e articles du funicule égaux, 2 fois plus longs que larges. La distance interoculaire égale à peine la longueur des 2 premiers articles du funicule. Structure et sculpture de la tête et du thorax comme chez la ♀. 6e tergite aplati et brillant comme chez les espèces précédentes. Echancrure des fémurs antérieurs comme chez *vestitus*. Tarses antérieurs avec un peigne. Cellule radiale assez fortement tronquée.

La ♀ de *T. incanus* se rapproche de celle de *vestitus ;* elle est bien caractérisée par la forme de son clypéus et la structure de son aire pygidiale. Le ♂, que je rattache avec doute à cette espèce (il s'agit d'un individu en mauvais état) se distingue de celui de *vestitus* par sa distance interoculaire plus faible.

Cette espèce n'a pas encore été rencontrée en Egypte. Je n'ai étudié que 2 ♀♀, dont l'une désignée comme type étiquetée : « Mauritanie. Trarza Mederdra. G. Mère 1908 » (Muséum de Paris). Le ♂ douteux provient de Cyrénaïque : Djarabub, Géo C. Kruger (Muséum de Gênes).

Tachysphex deserticola de Beaumont

♀. 7-8 mm. Sont d'un ferrugineux clair : le clypéus, les scapes, la moitié basale du funicule, les tubercules huméraux, l'abdomen et les pattes en entier. Une pilosité argentée couchée dense recouvre la face, le clypéus, les tempes, tout le thorax et le propodéum, cachant les téguments chez les individus frais. Les 4 premiers tergites à pilosité argentée couchée, assez longue sur les 2 premiers surtout. Fémurs avec une pilosité couchée assez dense. Ailes hyalines.

(¹) Dans la description originale de cette espèce, il est indiqué que la partie basale de l'aire pygidiale est rugueuse; cette apparence était due en réalité à un dépôt très régulier de matière étrangère.

Le clypéus est tout à fait aplati, comme chez les espèces précédentes, recouvert par la pilosité ; son bord antérieur faiblement arqué, comme chez *vestitus*. Les 2 premiers articles du funicule d'égale longueur, un peu plus de 2 fois aussi longs que larges. La face est très fortement bombée en dessus de l'insertion des antennes (fig. 56), plus nettement que chez *vestitus*. Vertex mat et finement ponctué ; la distance interoculaire égale la longueur des articles 2 et 3 du funicule. Tempes presque absentes dans le haut. Thorax, pour autant qu'on peut le voir sous la pilosité, mat, à ponctuation très fine Aire pygidiale entièrement lisse et brillante, avec quelques petits points, bombée, très peu nettement bordée. Pattes comme chez les espèces précédentes. La cellule radiale est fortement tronquée ; la 2e cellule cubitale très étroite en haut, parfois triangulaire, la 3e, au contraire, large.

♂. 5,5-6 mm. Coloration et pilosité comme chez la ♀, mais les derniers tergites obscurcis.

Clypéus, comme chez la ♀, plat et recouvert par la pilosité ; son bord antérieur est faiblement arqué. 2e et 3e articles du funicule d'égale longueur, 2 fois plus longs que larges. Face, comme chez la ♀, fortement proéminente entre les antennes et le tubercule ocellaire. La distance interoculaire égale la longueur des 3 premiers articles du funicule. Sculpture des téguments comme chez la ♀. Dernier tergite comme chez les espèces précédentes, plat, brillant, avec une ponctuation peu nette. L'échancrure des fémurs antérieurs est beaucop moins accusée que chez les espèces précédentes ; pattes autrement, comme chez celles-ci. Nervulation comme chez la ♀.

Armature génitale : La volsella et les crochets ont la même forme générale que chez les autres espèces du groupe, mais les soies de la volsella ne sont pas en palette ; elles sont simplement recourbées près de leur extrémité (figs. 66 et 67).

T. deserticola est voisin des 2 espèces précédentes par son aspect général (coloration et pilosité). Les 2 sexes s'en distinguent par une taille plus faible, la face plus fortement bombée, la distance interoculaire plus grande, la ♀ de plus par la forme de son aire pygidiale, le ♂ par la faible échancrure de ses fémurs antérieurs.

J'ai étudié 3 ♀♀, dont l'une désignée comme type, de l'oasis de Kharga, et 2 ♂♂, l'un du désert nubique : Nabardi (British Museum, allotype) et l'autre de Cyrénaïque : 85 km. au sud de Gialo (Muséum de Gênes).

GROUPE DE *BICOLOR*

Les espèces appartenant à ce groupe et dont *bicolor* Brullé (= *spoliatus* Gir., *rufipes* Aich.) est le chef de file, n'ont pas de parenté étroite avec celles des groupes précédents. Le labre est en forme de lame verticale et presque entièrement caché par le clypéus, mais la galéa des maxilles est plus longue que chez les espèces du groupe de *fluctuatus*, quoique plus courte que chez celles du groupe de *panzeri*. Les tempes sont plus fortement développées que chez les autres espèces ; le propodéum est arrondi en arrière, sans carène entre ses faces supérieure et postérieure. La sculpture des mésopleures et du propodéum est toujours très fine, sans ponctuation et sans forte striation ; seule la face postérieure du propodéum montre une très fine striation transversale. Chez la ♀, la dépression terminale du 5e tergite est bien limitée, avec des soies à sa base. Les pattes sont plus robustes et plus courtes que chez toutes les autres espèces. Chez la ♀, les épines sont fortes et épaisses, mais la face supérieure du métatarse en est dépourvue ; par contre les 2 épines de la face supérieure du métatarse postérieur sont bien évidentes ; tibias antérieurs avec 2 longues épines terminales à leur angle inféro-externe. Le plus grand éperon des tibias postérieurs atteint ou dépasse l'apex des métatarses. Volsella en général allongée dans le sens vertical, souvent avec un appendice dorsal bien développé ; soies fréquemment un peu élargies et sinueuses à l'extrémité. De nombreuses dents aux crochets.

Aucune espèce de ce groupe n'a été repérée en Egypte, mais j'en décris une qui pourrait bien s'y trouver, puisqu'elle a été rencontrée en Cyrénaïque.

Tachysphex cyrenaicus spec. nov.

♀. 10 mm. Les 3 premiers segments abdominaux rouges ; tarses d'un ferrugineux obscur à l'extrémité. Ailes faiblement, mais régulièrement, enfumées, avec les nervures d'un brun foncé. Bas de la face avec une fine pilosité argentée couchée, ne cachant pas la sculpture. Pilosité du thorax très courte et très fine, peu abondante, celle du propodéum un peu plus longue, dressée. Pas de pruinosité argentée sur les tergites abdominaux.

Clypéus semblable à celui de *bicolor* Br., mais moins ponctué dans sa partie apicale. 2e et 3e articles du funicule 2 fois plus longs que larges. Face avec un sillon peu profond entre l'ocelle antérieur et la base des antennes ; des deux côtés de ce sillon, la face est mate, avec une ponctuation assez fine et espacée, les espaces en moyenne nettement plus grands que les points ; cette ponctuation est nettement plus forte et plus espacée que chez *bicolor ;* sur les côtés de la face, elle devient plus fine et plus dense. Vertex brillant, à ponctuation beaucoup plus fine et plus espacée que celle de la face ; la distance interoculaire égale la longueur des articles 2 et 3 du funicule réunis. Tempes très développées, comme chez les autres espèces du groupe, avec une ponctuation semblable à celle du vertex. Disque du mésonotum brillant, à ponctuation très fine, un peu irrégulière et espacée ; les espaces en moyenne beaucoup plus grands que les points ; scutellum à ponctuation encore plus espacée. Thorax et propodéum avec la même microsculpture que chez *bicolor*, un peu plus fine que chez cette espèce sur la face dorsale du propodéum Aire pygidiale étroite et allongée, avec une ponctuation forte et dense (fig. 73). Pattes fortement épineuses, comme chez les autres espèces du groupe; face externe des fémurs antérieurs à ponctuation fine et espacée; 4 rangées d'épines aux tibias postérieurs, dont le plus grand éperon dépasse nettement l'apex du métatarse.

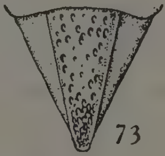


Fig. 73 : *T. cyrenaicus* ♀, aire pygidiale.

Cette espèce se distingue de *bicolor* Br., *adjunctus* Kohl et *denisi* de B. par ses pattes noires, la ponctuation plus espacée de la tête et du dos du thorax, l'aire pygidiale plus étroite et plus ponctuée. Elle est surtout voisine de *latifrons* Kohl, dont elle se distingue par la taille plus forte, les ailes plus foncées. l'aire pygidiale plus étroite et plus fortement ponctuée, la ponctuation encore plus espacée de la tête et du dos du thorax.

Je n'ai étudié qu'une seule ♀ (type) de Cyrénaïque : R.U. Agrario, IV 26, Géo C. Krüger (Muséum de Vienne).

GROUPE DE *NITIDUS*

L'arrangement des espèces appartenant à ce groupe et aux 3 suivants (*pompiliformis*, *mediterraneus* et *speciosissimus*) présente de grandes difficultés et le système que j'adopte ici doit être considéré comme provisoire. Toutes ces espèces ont le labre aplati et les pièces buccales courtes, ce qui les sépare des groupes de *panzeri* et de *luxuriosus;* elle se distinguent de celles du groupe de *fluctuatus* et des groupes voisins par le vertex généralement plus large, les tempes plus développées, le propodéum plus arrondi en arrière et par l'absence de diverses particularités propres à ces groupes; elle se distinguent enfin des espèces du groupe de *bicolor* par les pattes plus grêles et beaucoup moins épineuses, la sculpture des téguments, le propodéum moins arrondi en arrière, leur armature génitale. Toutes ont la cellule anale des ailes postérieures étroite à l'extrémité.

On peut réunir dans le groupe de *nitidus* une série d'espèces nettement apparentées. Toutes ont le corps et les pattes noirs. Le mésonotum est toujours plus ou moins brillant et nettement ponctué. Sur les mésopleures, la ponctuation est souvent nette aussi, mais elle peut s'effacer et les côtés du thorax sont alors brillants. Le propodéum est toujours réticulé sur sa face dorsale et strié sur ses côtés et sa face postérieure, qui montre une fossette bien marquée. Il n'y a jamais, sur le 5e tergite de la ♀, de dépression terminale nettement limitée et bordée de longues soies. Les pattes sont peu épineuses ; c'est ainsi que, chez la ♀, il y a tout au plus de très petites épines à la face supérieure des métatarses 1 et 3 ; extrémité du tibia inférieur avec deux épines de longueur différente à l'angle inféro-externe. L'armature génitale est d'un type homogène ; la volsella présente un appendice dorsal de forme variable selon les espèces ; les soies qui la garnissent sont droites et terminées par un petit bouton.

Il existe en Egypte d'autres espèces que celles qui sont signalées ici, mais le matériel dont j'ai disposé ne me permet pas pour l'instant de les définir avec précision.

Ayant déjà représenté dans un travail précédent (1936, 1) les caractéristiques principales des espèces de ce groupe, je ne répèterai pas ici cette illustration. On se reportera également à ce travail pour l'étude de l'armature génitale.

Tachysphex nitidus Spin.

♀. 6-9 mm. Corps noir ; une partie des mandibules et l'extrémité des tarses plus ou moins ferrugineuses. La pilosité de la tête et du thorax, blanche, est peu développée, laissant partout voir facilement la sculpture des téguments ; elle est couchée sur la base de la face, dressée sur le front, le vertex et le propodéum ; elle est notablement plus longue chez les spécimens d'Egypte que chez les individus d'Europe. Abdomen avec des bandes de pruinosité à l'extrémité des 3 premiers tergites.

La tête, vue de face, est un peu plus large que longue. L'aire apicale brillante du clypéus est à peu près aussi longue ou plus longue au milieu que l'aire basale ponctuée ; la limite entre ces deux zones est parfois nette, d'autres fois plus indistincte ; la lamelle est tronquée à peu près droit, montrant souvent, chez les individus frais, un petit lobe médian faiblement proéminent. Le 2e article du funicule est à peine plus court que le 3e, 2 1/4 à 2 1/2 fois plus long que large à l'extrémité. La ponctuation de la face est serrée, souvent assez dense pour qu'il en résulte une sculpture réticulée. Sur le vertex, qui porte une impression médiane peu profonde, la ponctuation est nette et espacée ; la distance interoculaire est plus grande que la longueur des articles 1 et 2 du funicule, mais plus courte que celle des articles 2 et 3. Tempes moyennement développées. Mésonotum et scutellum brillants avec une ponctuation moyenne et de densité variable selon les individus ; les espaces sont, au moins par endroits, plus grands que les points. La ponctuation des mésopleures est plus fine que celle du mésonotum ; elle est en général dense, devenant plus serrée en arrière. Propodéum à faces latérales brillantes, avec une striation oblique nette ; la face dorsale est réticulée et montre généralement de plus des stries longitudinales sinueuses. Aire pygidiale en triangle allongé, très brillante, avec quelques points microscopiques espacés. La partie médiane du premier sternite ne montre que des points espacés.

♂. 5-7 mm. Coloration et pilosité comme chez la ♀ ; les poils qui recouvrent la face et le clypéus ont souvent un léger reflet doré ; le 4e tergite porte parfois, comme les précédents, une bande de pruinosité argentée.

La lamelle du clypéus, un peu bombée, forme en avant un angle très net ; les aires basale et apicale ne sont pas nettement limitées. Antennes relativement courtes ; le 2e article est plus court que le 3e ; ce dernier et les suivants sont à peu près 1 3/4 fois aussi longs que larges. Distance interoculaire égalant à peu près la longueur des 3 premiers articles du funicule. Sculpture de la tête et du thorax comme chez la ♀. Le 7e tergite est très finement ponctué, comme les précédents. Tarse antérieur sans peigne.

Dans un travail précédent (1936, 1), j'avais montré que, sous le nom de *nitidus*, se trouvaient confondues 3 formes, que j'avais nommées var. A, B et C. Ces 3 formes se rencontrant côte à côte dans une grande partie de la région paléarctique, il me semble logique de les considérer comme 3 espèces distinctes, quoique très voisines. C'est à la var. A que je conserve le nom de *nitidus ;* il n'est évidemment pas possible de savoir, d'après la brève description de Spinola, si cette attribution est justifiée et l'examen des types serait bien nécessaire. Cependant, il est probable que Spinola, comme les auteurs suivants, confondait sous le nom de *nitidus* les divers *Tachysphex* noirs ; comme celui que je viens de décrire est le plus commun, il m'a semblé logique de maintenir pour cette espèce la dénomination de Spinola.

T. nitidus est très répandu dans la région paléarctique ; c'est semble-t-il, le *Tachysphex* noir qui remonte le plus au nord en Europe, mais il est fréquent aussi dans toute l'Afrique du nord.

Tachysphex tarsinus Lep.

♀. 8-11 mm. Coloration et pilosité comme chez *nitidus*. Cependant, la pilosité des spécimens d'Egypte n'est pas plus longue que celle des individus d'Europe ; elle est de ce fait nettement plus courte que chez *nitidus*.

Le clypéus est moins bombé que chez l'espèce précédente ; son aire apicale brillante, nettement limitée, est plus courte au milieu que l'aire basale ponctuée. Face finement ponctuée, présentant, surtout au milieu, des espaces plus ou moins grands entre les points. Le vertex est un peu plus étroit que chez *nitidus*, avec une impression arrondie peu profonde. Ponctuation du thorax plus ou moins dense ; sur les mésopleures, les points sont souvent moins serrés en arrière qu'en avant. Face dorsale du propodéum en général irrégulièrement réticulée, mais parfois avec des stries longitudinales sinueuses.

Aire pygidiale brillante, mais souvent avec une striation microscopique, qui manque en général chez l'espèce précédente.

♂. 6-8 mm. Coloration et pilosité comme chez la ♀. La pilosité du clypéus n'a pas de reflets dorés.

Le clypéus présente une aire apicale brillante nettement limitée, en forme de croissant, ce que l'on remarque surtout en examinant la tête un peu par dessous ; la lamelle est plus mince que chez *nitidus ;* elle peut être plus ou moins développée, mais ne présente jamais la forme triangulaire et bombée que l'on voit chez l'espèce précédente. Sculpture de la tête et du thorax comme chez la ♀ ; 7e tergite ponctué comme le précédent ; tarse antérieur sans peigne.

C'est cette espèce, dont j'ai vu le type (Muséum de Paris), que j'avais nommée précédemment *nitidus* var. B. Elle est évidemment très voisine de la précédente dont elle se distingue difficilement sans matériel de comparaison. Les caractères que j'ai indiqués me semblent cependant suffisamment constants pour faire de *tarsinus* une espèce distincte.

L'espèce est plus rare que la précédente et semble manquer dans le nord de l'Europe ; elle est par contre répandue dans la région méditerranéenne et j'en ai étudié une dizaine de spécimens d'origine égyptienne.

Tachysphex nitidior de Beaumont

♀. 9-11 mm. Coloration et pilosité comme chez *nitidus*. Ici aussi, la pilosité des individus d'Egypte est un peu plus longue que celle des spécimens d'Europe, mais elle n'atteint pas la longueur de celle des *nitidus* égyptiens.

Le clypéus ressemble à celui de *tarsinus*. Face nettement ponctuée, avec des espaces, généralement brillants, entre les points. Vertex semblable à celui de *tarsinus*, mais avec une ponctuation plus espacée. Tempes moins développées que chez cette espèce. La ponctuation du mésonotum et des mésopleures est plus forte et plus espacée qu'elle ne l'est en général chez les 2 espèces précédentes ; ces parties sont de ce fait plus brillantes. Le mésonotum présente souvent en avant une impression longitudinale médiane assez large, mais ce caractère est variable. Face dorsale du propodéum irrégulièrement réticulée. Aire pygidiale comme chez *tarsinus*. Sur le 2e sternite, la ponctuation s'étend aussi, quoique moins dense, à la partie médiane.

♂. 5-8 mm. Coloration et pilosité comme chez la ♀ ; la partie médiane des mandibules est généralement d'un ferrugineux très clair, jaunâtre.

La forme du clypéus est moins stable que chez les espèces précédentes : la partie médiane est plus étroite en avant que chez *tarsinus ;* l'aire apicale est généralement bien limitée, en forme de croissant. Sculpture de la tête et du thorax comme chez la ♀ ; l'impression de la partie antérieure du mésonotum est en général indistincte. Les derniers tergites abdominaux, et en particulier le 7e, ne sont pratiquement pas ponctués, plus brillants que chez les espèces précédentes. Sur les sternites, et notamment sur le 2e, la ponctuation est au contraire plus distincte. Tarses antérieurs sans peigne.

C'est à cette espèce que j'avais donné le nom de *nitidus* var. C. La détermination reste toujours difficile sans matériel de comparaison.

T. nitidior semble, en Europe, encore plus méridional que les espèces précédentes ; il est répandu en Afrique du nord et j'en ai vu 5 individus de provenance égyptienne. Type (♀) et allotype (♂), de Gibraltar, au British Museum.

Tachysphex helveticus Kohl

Les individus d'Egypte appartiennent à la sous-espèce *aegyptiacus* Morice dont je donne ci-dessous la description.

♀. 8-10 mm. Coloration comme chez *nitidus*. La pilosité est aussi longue que chez les exemplaires égyptiens de cette dernière espèce.

La tête, vue de face, apparaît plus large que chez *nitidus*. Le bord antérieur du clypéus est régulièrement et faiblement arqué ; le clypéus, dans son ensemble, est beaucoup moins bombé que chez les espèces précédentes ; l'aire apicale lisse est absente ou à peine indiquée. 2e articlce du funicule nettement plus court que le 3e ; ce dernier et les suivants à peu près 3 fois plus longs que larges ; les antennes, dans leur ensemble, plus longues que chez *nitidus*. Ponctuation de la face irrégulière, espacée par endroits. Vertex brillant, à ponctuation espacée ; la distance interoculaire égale à peu près la longueur des articcles 2 et 3 du funicule ; comme ces articles sont nettement plus longs que chez *nitidus*, le vertex apparait distinctement plus large que chez cette espèce. Tempes peu développées, comme chez *nitidus*. Ponctuation du mésonotum espacée, les espaces en moyenne nettement plus grands que les points ; mésopleures à ponctuation peu nette, fine, espacée, s'effaçant complètement en arrière. Face dorsale du propodéum réticulée ou striée, ses côtés obliquement striés. Aire pygidiale comme chez *nitidus*. Le métatarse antérieur ne porte généralement que 5-6 épines.

♂. 6-8 mm. Coloration et pilosité comme chez la ♀.

Comme chez la ♀, le clypéus est aplati, avec une zone apicale brillante nulle ou très peu développée ; la lamelle est peu développée aussi. Antennes un peu plus longues que chez *nitidus* ; le 3e article du funicule est 2 fois aussi long que large. La distance interoculaire est plus grande que la longueur des 3 premiers articles du funicule. Sculpture de la tête et du thorax comme chez la ♀, la ponctuation cependant un peu plus dense. Le tarse antérieur est muni d'un peigne qui manque aux espèces précédentes ; le métatarse porte 4-5 épines blanches ; les 2 épines de l'extrémité du 2e article atteignent l'apex du 3e article.

T. helveticus se distingue des espèces précédentes par son clypéus très aplati, son vertex plus large, la ponctuation effacée de la partie postérieure des mésopleures. Le ♂ se distingue facilement des précédents à la présence d'un peigne au tarse antérieur, caractère qu'il partage avec *filicornis*. La ssp. *aegyptiacus* diffère de la forme typique par la ponctuation plus forte et beaucoup plus espacée de la face et des mésopleures et par la pilosité plus longue ; tous les caractères essentiels restant semblables, il me semble logique de faire d'*aegyptiacus* une race géographique d'*helveticus*. J'ai étudié une vingtaine de spécimens égyptiens de cette forme, et en particulier les types de Morice.

Tachysphex filicornis Kohl

♀. 8-10 mm. Coloration et pilosité comme chez l'espèce précédente.

Tête, vue de face, un peu moins large que chez *helveticus*. Le clypéus ressemble beaucoup à celui de cette espèce ; il est très aplati, sans aire apicale distincte. Antennes remarquablement allongées ; les articles du funicule, à partir du 3e, sont 4 à 5 fois plus longs que larges. Face à ponctuation très serrée, chagrinée. Vertex à ponctuation plus serrée que chez l'espèce précédente. La distance interoculaire, du fait de la longueur des articles des antennes, est plus courte que la longueur des articles 1 et 2 du funicule. Ponctuation du mésonotum plus serrée que chez *helveticus aegyptiacus ;* les espaces ne sont nulle part plus grands que les points ; la ponctuation des mésopleures est également un peu plus distincte que chez les *helveticus* d'Egypte. Il n'y a pas de différences de sculpture nettes entre les *filicornis* de l'Europe méridoniale et ceux d'Egypte ; ces derniers ont cependant la face dorsale du propodéum plus distinctement striée longitudinalement. Aire pygidiale moins brillante que celle d'*helveticus*, avec une striation microscopique sur toute sa surface.

♂. Je n'ai pas trouvé de caractères qui permettent de le distinguer à coup sûr de celui de l'espèce précédente ; il présente, comme ce dernier, un peigne aux tarses antérieurs.

Comme l'on peut s'en rendre compte d'après la description, *T. filicornis* est extrêmement voisin d'*helveticus ;* la ♀ se reconnaîtra cependant sans peigne à la longueur des articles de son funicule.

L'espèce est répandue dans toute la région méditerranéenne ; j'ai étudié une vingtaine de spécimens originaires d'Egypte.

Tachysphex cabrerai Mercet

♀. 6-8 mm. Noire ; une partie des mandibules, une tache à la partie inférieure du scape, l'extrémité des tarses et en général l'extrémité de l'aire pygidiale ferrugineuses. Pilosité comme chez les espèces précédentes, mais le 4e tergite porte souvent, comme les précédents, une bande de pruinosité argentée.

Le clypéus ressemble à celui de *nitidus*. Articles du funicule plus courts que chez cette espèce. Face avec une ponctuation fine, irrégulière, plus ou moins rugueuse. Vertex brillant, nettemnt ponctué; la distanc interoculaire égale la longueur des articles 2 et 3 du funicule ou est un peu plus courte. Mésonotum brillant, à ponctuation moyennement forte et nette et un peu plus espacée chez les exemplaires égyptiens que chez ceux de l'Europe méridionale; les espaces par endroits aussi grands que les points. Mésopleures à ponctuation fine, indistincte et espacée, très brillantes en arrière. Face dorsale du propodéum irrégulièrement réticulée, avec des stries longitudinales plus ou moins nettes; les faces latérales, très brillantes, à striation oblique très nette. Aire pygidiale de même forme que chez les espèces précédentes, très brillante, avec de ptits points épars.

♂. 4,5-6 mm. Coloration et pilosité comme chez la ♀; l'abdomen montre des bandes de pruinosité argentée à l'extrémité des 4 ou des 5 premiers tergites.

Le clypéus avec une aire apicale brillante parfois très réduite; la lamelle arquée en avant. Les articles moyens du funicule sont à peine plus longs que larges; ils présentent une structure particulière, bien visible à un fort grossissement et sous certains éclairages : leur face antérieure, plus mate et leur face postérieure, plus brillante, sont séparées par une limite nette qui apparaît, suivant l'éclairage, comme une petite carène ou un petit sillon. La distance interoculaire égale la longueur des 3 premiers articles du funicule. Sculpture comme chez la ♀, mais les mésopleures sont un peu plus nettement ponctuées. Tarses antérieurs sans peigne.

T. cabrerai se reconnaît à sa petite taille, aux côtés du thorax très brillants. La tache ferrugineuse de l'extrémité du scape est assez caractéristique aussi. La structure particulière des antennes permettra de reconnaître sans autres le ♂.

L'espèce semble assez rare, mais répandue dans une grande partie de la région méditerranéenne. Les spécimens que j'ai étudiés provenaient d'Espagne, de la France méridionale, de Chypre, du Maroc, d'Algérie et d'Egypte; je n'ai vu que 6 spécimens d'origine égyptienne.

GROUPE DE *POMPILIFORMIS*

Groupe très voisin du précédent, auquel il est plus ou moins relié par des intermédiaires, et auquel il serait peut être plus logique de le réunir, comme je l'avais fait précédemment. La plupart des espèces ont l'abdomen rouge à la base et les pattes noires. Contrairement à ce que l'on voit dans le groupe de *nitidus*, les mésopleures ne sont jamais brillantes ou distinctement ponctuées ; les pattes sont souvent un peu plus épineuses que chez les espèces de ce dernier groupe.

Tachysphex pompiliformis Pz.
(= pectinipes auct.)

Je ne donnerai ici qu'une brève description de cette espèce, commune dans toute l'Europe.

♀. 7-9 mm. Les 2 ou plus fréquemment les 3 premiers segments abdominaux rouges ; pattes noires, les tarses ferrugineux à l'extrémité. Pilosité peu développée.

Clypéus avec une aire apicale brillante et parsemée de gros points, à peu près aussi longue au milieu que l'aire basale ; lamelle faiblement arquée en avant. Ponctuation de la face, du vertex et du mésonotum fine et dense. La distance interoculaire est égale ou un peu supérieure à la longueur des 2 premiers articles du funicule. Tempes moyennement développées. Mésopleures mates, finement chagrinées, sans ponctuation. Propodéum réticulé sur sa face dorsale, généralement strié sur ses faces latérales. Aire pygidiale allongée, finement chagrinée, avec quelques petits points.

♂. 5-7 mm. Coloration et pilosité comme chez la ♀.

Le clypéus montre une aire apicale brillante plus ou moins étendue, pas nettement limitée de l'aire basale ; la lamelle est faiblement arquée en avant. La distance interoculaire égale la longueur des articles 2 et 3 du funicule. Pas de peigne aux tarses antérieurs.

J'ai reçu du Muséum de Vienne 2 ♂♂ et 1 ♀ de cette espèce étiquetés : « Adelen-Insel, Aegypten '97, Schmiedekn. ». Ces spécimens sont identiques aux *pompiliformis* d'Europe. Je ne puis m'empêcher d'avoir quelques doutes sur leur véritable provenance, car l'espèce est déjà rare dans la partie occidentale de l'Afrique du Nord et je n'en ai vu aucun spécimen dans le riche matériel mis à ma disposition par mes collègues d'Egypte.

GROUPE DE *MEDITERRANEUS*

Je place ici deux espèces noires, dont une seule a été trouvée en Egypte, et qui présentent un certain nombre de caractères communs, en particulier dans la forme et la sculpture de la tête et la forme de la volsella, dont les soies ne sont pas terminées par un bouton. Ce dernier caractère, de même que la présence sur le 5e tergite de la ♀ d'une dépression terminale assez nettement limitée et quelques autres particularités distinguent ces espèces de celles du groupe de *nitidus*.

Tachysphex plicosus Costa
(= ! gallicus Kohl)

♀. 7-8 mm. Corps noir. Ailes hyalines. La pilosité est blanche, dressée sur la face, le vertex, le thorax et le propodéum, couchée sur le clypéus, ne cachant nulle part les téguments.

Clypéus peu bombé, sans limite nette entre les aires basale et apicale; la lamelle est faiblement arquée en avant, limitée sur les côtés par des angles nets. 2e article du funicule à peine plus court que le 3e; ce dernier 2 1/2 fois aussi long que large. Face à sculpture fondamentale d'aspect soyeux avec de plus une ponctuation fine et très espacée, parfois indistincte. Vertex avecc une ponctuation plus nette, avec une profonde impression en forme de ligne arquée; la distance interoculaire égale presque la longueur des 3 premiers articles du funicule. Tempes peu développées. Mésonotum plus ou moins brillant, avec une ponctuation fine et très espacée, les espaces beaucoup plus grands que les points; scutellum à ponctuation encore plus fine et très espacée. Ponctuation des mésopleures plus forte et plus serrée que celle du mésonotum, très nette. Face dorsale du propodéum avec de fortes stries un peu sinueuses, divergeant à partir de la base; les faces latérales, séparées de la face dorsale par une carène, montrent quelques courtes stries obliques près des bords antérieur, inférieur et postérieur; le reste de la surface est lisse, brillant, avec une ponctuation très fine et espacée, devenant parfois indistincte. Face postérieure avec des stries transversales; l'une d'elles, plus forte, située à la partie supérieure de la fossette, continue la carène qui sépare les faces dorsale et latérales. Aire pygidiale étroite, brillante, avec une ponctuation espacée. Les épines du métatarse antérieur, très fines, sont réparties en 2 groupes très distincts, l'un à la base, l'autre à l'apex de l'article; les épines de l'extrémité du tibia 1, à sa face externe, sont remplacées par 2 longues soies.

♂. 6,5-7 mm. Coloration et pilosité comme chez la ♀.

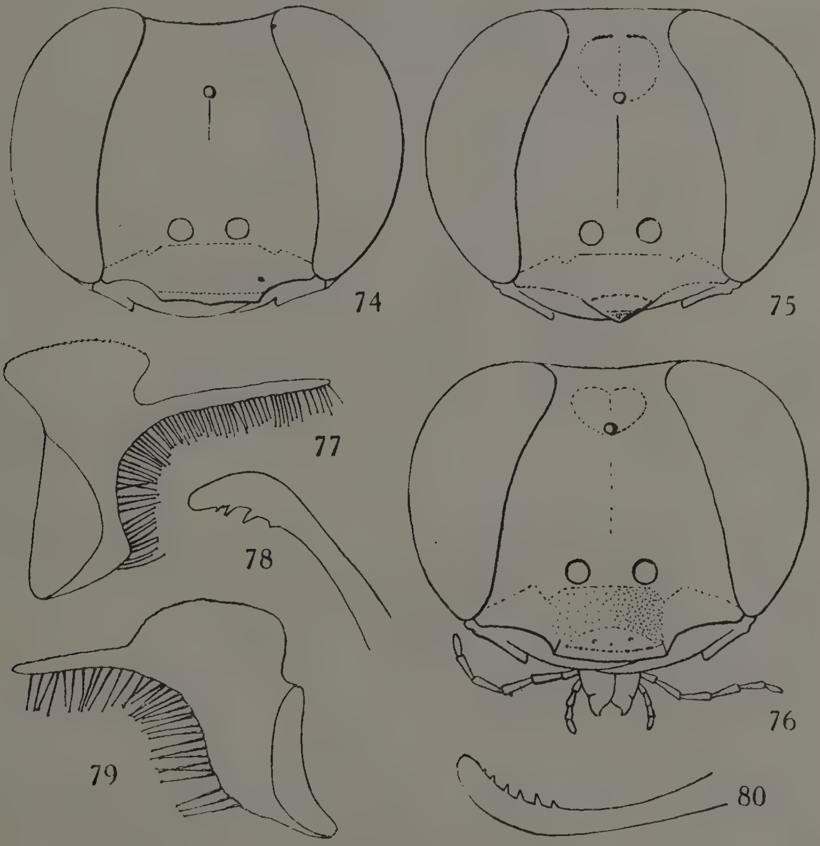
Le clypéus est semblable à celui de *nitidus*. Structure et sculpture de la tête, du thorax et du propodéum comme chez la ♀. Le 2e article du funicule est plus long que le 3e; ce dernier est 2 fois plus long que large. La distance interoculaire est grande, égalant la longueur des articles 2, 3 et 4 du funicule. Métatarse antérieur sans peigne.

Armature génitale : J'ai figuré précédemment (1936, 1) celle-ci; elle est caractérisée entre autres par les soies de la volsella, élargie à l'extrémité.

T. plicosus est bien caractcérisé, en particulier par la structure et la sculpture de son propodéum. C'est une espèce qui semble rare, mais assez répandue dans le bassin méditerranéen. J'en ai étudié une dizaine de spécimens, de France méridionale, d'Italie, de Trieste, de l'île de Kos, du Maroc et d'Algérie; je n'ai vu que deux spécimens de la Basse Egypte.

GROUPE DE *SPECIOSISSIMUS*

Tel qu'il est compris ici, ce groupe est probablement très artificiel; il sert simplement à réunir 3 espèces qui n'ont peut-être pas de proche parenté entre elles, mais qui ne se placent logiquement dans aucun des groupes précédents. Elles se distinguent des espèces des groupes de *nitidus* et de *pompiliformis* par les pattes plus élancées, à épines plus longues, la présence d'épines à la face supérieure du métatarse 3 de la ♀, le vertex plus large, souvent concave. La volsella de l'armature génitale porte des soies nombreuses et terminées par un petit bouton.



Tachysphex du groupe de *speciosissimus*

Fig. 74 : *T. priesneri* ♀, tête vue de face. — Fig. 75 : *T. fasciatus* ♀, id. — Fig. 76 : *T. speciosissimus* ♀, id. — Fig. 77 : *T. priesneri* ♂, volsella. — Fig. 78 : id., crochet. — Fig. 79 : *T. fasciatus* ♂, volsella. — Fig. 80 : id., crochet.

On trouve en Egypte quelques espèces voisines de l'une ou de l'autre de celles que je signale ici, mais le manque de matériel ne me permet pas de les décrire pour le moment.

Tachysphex speciosissimus Morice

♀. 8-10 mm. L'abdomen, tous les tibias et les tarses, l'extrémité des fémurs 1 et 2, ainsi qu'une grande partie des fémurs 3 sont d'un ferrugineux clair ; une partie des mandibules, une tache à la partie inférieure des scapes et les tubercules huméraux sont jaunâtres. Ailes hyalines. Face et clypéus à pilosité argentée couchée dense, cachant la sculpture ; sur le thorax et le propodéum, la pilosité est blanche, presque couchée, dense, ne laissant voir la sculpture, chez les individus frais, que sur la partie centrale du mésonotum, le scutellum et la face postérieure du propodéum. Les 5 premiers tergites avec des bandes de pruinosité argentée.

La tête, vue de face, est large, avec le vertex nettement concave (fig. 76). Clypéus avec une aire apicale brillante nettement limitée, à peine ponctuée ; la lamelle est faiblement arquée en avant. 2e article du funicule un peu plus court que le 3e ; celui-ci et les suivants 3 fois plus longs que larges. Vertex avec une ponctuation très fine et très dense, les points peu nettement enfoncés ; en arrière des ocelles postérieurs se voit une dépression assez large, nettement limitée en arrière, plus brillante que le reste du vertex ; la distance interoculaire égale la longueur des 2 premiers articles du funicule, augmentée de la moitié du 3e. Tempes peu développées. Ponctuation de la partie centrale du mésonotum fine et espacée, les espaces 2 à 3 fois plus grands que les points. Le 5e tergite sans longues soies avant sa dépression terminale qui est peu nettement limimtée. Aire pygidiale étroite, finement striolée, avec de petits points épars, ressemblant à celle de *panzeri*. Pattes longues et grêles, avec de longues épines ; avant dernier article des tarses postérieurs 1,5 fois plus long que large, échancré sur le tiers de sa longueur. Cellule radiale fortement tronquée à l'extrémité.

♂. Inconnu.

J'ai étudié le type de Morice ainsi que 2 exemplaires de la Basse Egypte qui lui étaient semblables. J'ai d'autre part examiné le type de *redivivus* Kohl et une 2e ♀ semblable à celui-ci. Ces deux exemplaires ne se distinguent de *speciosissimus* que par la couleur noire plus étendue sur les fémurs postérieurs, les tergites 5 et 6 noirs avec des zones ferrugineuses, les tergites 3 et 4 avec une ombre noire au milieu, la présence de 4 bandes de pruinosité à l'abdomen et la distance interoculaire un peu plus courte, n'égalant que la longueur des 2 premiers articles du funicule. Il est difficile, avec un matériel aussi restreint et en l'absence de ♂, de savoir si *redivivus* entre dans le cadre de la variation de *speciosissimus* ou s'il doit être considéré comme spécifiquement distinct.

T. speciosissimus ressemble au premier abord à certaines espèces du groupe de *panzeri*, dont il se distingue cependant par la structure de ses pièces buccales et bien d'autres caractères. La coloration de l'insecte, jointe à l'aspect de la tête vue de face et à la dense pilosité, permettront de reconnaître sans grandes difficultés cette espèce.

Tachysphex fasciatus Morice

♀. 9 mm. Noire ; la partie médiane des mandibules et les pattes, sauf les hanches, les trochanters et la base des fémurs 1 et 2, ferrugineux. L'extrémité des tergites, surtout celle des 3 premiers, largement et nettement décolorés. Ailes hyalines. Face à pilosité argentée dense, cachant la sculpture ; thorax et propodéum à pilosité fine et peu dense. Les 3 premiers tergites abdominaux recouverts d'une pruinosité argentée formant à l'extrémité des bandes peu nettes du fait qu'elles se trouvent sur la partie décolorée.

Tête, vue de face, large, avec le vertex horizontal. La partie apicale, seule visible, du clypéus est brillante et forme un angle net en avant (fig. 75). 2e article du funicule un peu plus court que le 3e ; ce dernier 2 fois plus long que large. Face assez bombée, mate, à ponctuation très fine. Vertex brillant, à ponctuation très fine et espacée, les espaces plusieurs fois plus grands que les points. La distance interoculaire est égale à la longueur des 3 premiers articles du funicule. Tempes relativement peu développées. Mésonotum et scutellum brillants, à ponctuation semblable à celle du vertex ; mésopleures demi brillantes, à ponctuation peu nette. Propodéum demi brillant, à sculpture excessivement fine, sans traces de stries sur ses faces dorsale et latérales ; face postérieure microscopiquement striée transversalement, avec une grande fossette. Le 5e tergite, plus brillant que les précédents, montre une rangée de soies avant sa dépression terminale. Aire pygidiale très nettement bordée, large, ses côtés un peu concaves. très brillante, avec quelques points microscopiques. Pattes moyennement élancées et moyennement épineuses ; avant-dernier article des tarses postérieurs à peine plus long que large, échancré sur un peu plus de la moitié de sa longueur ; le plus grand éperon des tibias postérieurs atteint les 3/4 du métatarse. La cellule radiale est fortement tronquée, comme chez l'espèce précédente ; la 3e cubitale est étroite sur la radiale et nettement étirée.

♂. 6 mm. Coloration et pilosité semblables à la ♀, mais la couleur ferrugineuse est moins étendue sur les pattes ; seule une partie des tibias et les tarses sont de cette couleur ; les 6 premiers tergites avec une fine pruinosité argentée.

Partie apicale du clypéus brillante, en arc peu accusé en avant. 2e article du funicule 1,5 fois aussi long que large, le 3e et les suivants à peine 2 fois plus longs que larges. La distance interoculaire égale la longueur des

3 premiers articles du funicule. Sculpture de la tête et du thorax comme chez la ♀ ; le propodéum montre quelques fines stries longitudinales sur sa face dorsale. Pattes plus grêles et moins épineuses que chez la ♀ ; échancrure des fémurs antérieurs moyennement développée ; les tarses antérieurs portent un peigne bien développé, formé d'épines blanches. Avant-dernier article des tarses postérieurs nettement plus long que large. Nervulation comme chez la ♀, mais chez le seul ♂ examiné, la 3e cellule cubitale était plus large et moins étirée.

Armature génitale : La volsella montre la même forme générale que chez les espèces du groupe de *nitidus ;* les soies sont fines, avec un très petit bouton terminal (figs. 79 et 80).

T. fasciatus se reconnait facilement à sa coloration : ses tergites à bordure décolorée et ses pattes rouges lui donnent un aspect caractéristique. La très fine sculpture du propodéum est aussi un bon caractère distinctif.

J'ai examiné le type de Morice, 1 ♀ sans tête des environs du Caire, une autre ♀ et un ♂ (Muséum de Vienne) de même provenance, ainsi qu'une ♀ de Biskra (coll. Morice).

Tachysphex priesneri de Beaumont

♀. 8,5-12 mm. Coloration comme chez *nitidus.* La pilosité ne cache nulle part la sculpture, mais, si elle n'est pas plus fournie que chez *nitidus*, elle est beaucoup plus longue ; c'est ainsi que l'on voit de longs poils dressés sur le front, le vertex, la partie inférieure des tempes, tout le thorax et le propodéum, la base du premier tergite, les fémurs, le scape et le pédicelle ; sur le bas de la face et le clypéus, les poils sont moins couchés que chez *nitidus ;* la pruinosité argentée de l'abdomen est par contre moins développée, ne formant pas de bandes nettes à l'extrémité des tergites. Ailes hyalines. La tête, vue de face, est plus large que longue (5 : 4) (fig. 74). La partie médiane du clypéus est plus étroite que chez *nitidus* et à peine bombée ; toute sa surface montre une ponctuation espacée, sans que l'on puisse distinguer une aire apicale définie, la lamelle est à peine arquée en avant. 2e article du funicule à peine plus court que le 3e ; ce dernier presque 3 fois plus long que large. Face à sculpture irrégulière, ponctuée dans le bas, chagrinée dans le haut. Vertex déprimé, concave lorsque l'on regarde la tête de face (fig. 74), très brillant, à ponctuation espacée et avec une impression transversale. Tempes à peine développées dans le haut. Partie médiane du mésonotum très brillante, à ponctuation très espacée, les espaces plusieurs fois plus grands que les points ; sur la partie antérieure et sur les côtés du mésonotum, la ponctuation devient serrée et indistincte. Scutellum très brillant et à ponctuation très espacée. Mésopleures brillantes dans le bas, plus mates en haut et en arrière, à sculpture irrégulière, sans ponctuation nette. Propodéum peu brillant, avec une striation longitudinale irrégulière assez fine. Abdomen brillant ; aire pygidiale en triangle allongé, très brillante, avec quelques points microscopiques. Epines des tarses plus longues et plus nombreuses que chez *nitidus*, en particulier sur le métatarse postérieur. 2e cellule cubitale en général fortement rétrécie sur la nervure radiale.

♂. 6-9 mm. Coloration et pilosité comme chez la ♀.

Le bord antérieur du clypéus est anguleux, comme chez *nitidus*. Le 2e article du funicule est à peu près de la longueur du 3e ; ce dernier et les suivants sont 2 fois plus longs que larges. La distance interoculaire est grande, égalant à peu près la longueur des 3 premiers articles du funicule augmentée de la moitié du 4e. Sculpture des téguments comme chez la ♀. Les tarses antérieur sont munis d'un peigne encore plus développé que celui d'*helveticus* ou de *filicornis*.

Armature génitale : Les soies qui garnissent la volsella sont courtes et très nombreuses (figs. 77 et 78).

T. priesneri, que j'avais placé primitivement dans le groupe de *nitidus*, se distingue facilement par la sculpture de ses téguments, la longueur et l'étendue de la pilosité, le vertex concave.

J'ai vu 7 exemplaires d'origine égyptienne et 2 ♀♀ du Sud-Algérien.

GROUPE DE *BREVIPENNIS*

Les espèces qui forment ce groupe sont caractérisées avant tout par l'absence de suture épisternale aux mésopleures, particularité que l'on ne remarque chez aucun autre *Tachysphex* (fig. 81). Les ailes sont courtes ; aux antérieures la cellule radiale est toujours plus ou moins fortement tronquée et la 3e cubitale très peu étirée. Le mésonotum tombe moins verticalement en avant que chez les autres espèces ; le pronotum est fréquemment peu surbaissé par rapport au mésonotum, mais ce n'est guère le cas chez la seule espèce égyptienne du groupe. Chez certaines espèces, les yeux n'atteignent pas tout à fait l'articulation des mandibules. Le propodéum est court, fortement rétréci en arrière, toujours fortement strié sur ses côtés ; sa face supérieure montre aussi, au moins chez la ♀, une striation longitudinale. L'abdomen est plus nettement ponctué que chez les espèces des groupes précédents, mais cette ponctuation est toujours fine et dense. Notons encore que la face est aplatie, que le clypéus de la ♀ montre toujours une aire apicale brillante nettement limitée et que les pattes sont peu épineuses. L'armature génitale ne se distingue guère de celle des espèces des groupes *nitidus* et *pompiliformis* que par l'absence d'appendice à la volsella ; les soies de celles-ci sont droites et terminées par un petit bouton.

Les diverses espèces appartenant à ce groupe, et dont *brevipennis* Mercet est le type, sont étroitement apparentées entre elles et également avec celles qu'Arnold a décrites d'Afrique sous le nom générique d'*Atelosphex*. Comme je le montrerai ailleurs, ce genre ne peut donc être maintenu, car il y a sans doute aussi des liens de parenté entre ces espèces et celles du groupe de *pompiliformis*.

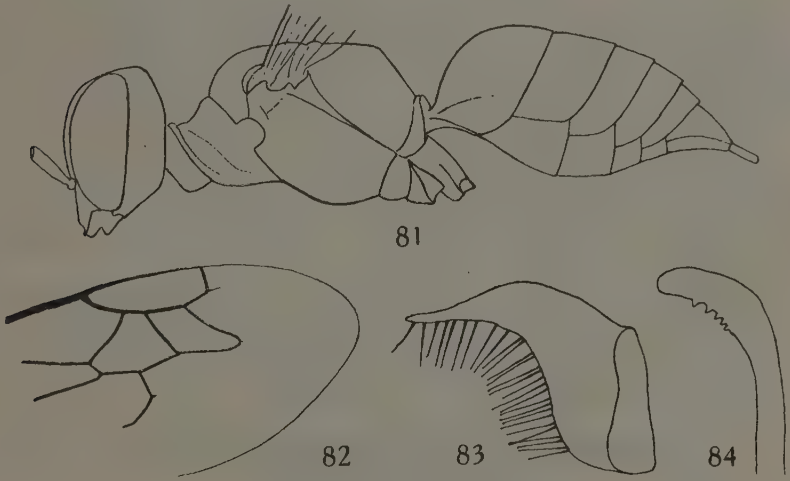
Tachysphex imperfectus de Beaumont

♀. 7-8 mm. Noire ; l'extension de la couleur ferrugineuse est variable : chez l'exemplaire le plus coloré, de Biskra, choisi comme type, elle atteint les mandibules sauf leur apex, le clypéus en entier, les 6 premiers articles des antennes, 2 petites taches en dessus de l'insertion des antennes, la plus grande partie des fémurs, une partie des tibias et des tarses, surtout aux pattes antérieures ; les zones des antennes et des pattes qui ne sont pas ferrugineuses sont d'un brun foncé ; chez un 2e exemplaire, de Tunisie, les pattes sont presque entièrement noires ; chez un 3e spécimen, d'Egypte, les pattes sont noires et la couleur ferrugineuse est restreinte à la base des mandibules, à l'apex du clypéus et aux 5 premiers articles des antennes, les 2 premiers et le 5e étant en partie obscurcis. Ailes très légèrement enfumées, à nervulation brune. Pilosité argentée couchée de la tête et du thorax moyennement développée, ne cachant nulle part les téguments. Abdomen recouvert d'une fine pruinosité, argentée sur les 3 premiers segments où elle forme des bandes apicales, brune sur les 2 suivants.

Clypéus à aire apicale aplatie et brillante, nettement limitée de l'aire basale ; la lamelle très faiblement arquée en avant. Les yeux atteignent l'articulation des mandibules. Scapes renflés à l'extrémité, mais moins nettement que chez *brevipennis* Mercet. Les articles 2 et 3 du funicule sont de même longueur, 2 1/2 à 3 fois aussi longs que larges. Face tout à fait aplatie, mate, à sculpture réticulée. Vertex horizontal, à ponctuation dense, les espaces plus petits que les points, avec une impression en forme de V, très peu marquée ; la distance interoculaire est un peu inférieure à la longueur des deux premiers articles du funiccule. Tempes très développées. Face dorsale du pronotum à un niveau inférieur à celui du mésonotum (fig. 81). Ponctuation du mésonotum dense, avec des espaces linéaires entre les points ; celle du scutellum un peu plus espacée. Mésopleures mates et à sculpture réticulée dans leur moitié supérieure ; métapleures striées. Face dorsale du propodéum portant une dizaine de stries longitudinales bien accusées ; les faces latérales montrent aussi des stries longitudinales nettement marquées, qui passent sur la face postérieure ; celle-ci porte un sillon longitudinal médian dans sa partie supérieure. Abdomen complètement mat, à ponctuation fine et très dense ; l'aire pygidiale est également mate, finement chagrinée, avec quelques points isolés ; sa forme rappelle celle de *pompiliformis* Pz. Les pattes portent des épines relativement faibles ; l'avant dernier article des tarses postérieurs est nettement plus long que large, échancré sur un peu plus de la moitié de sa longueur. Le plus grand éperon des tibias postérieurs atteint la moitié de la longueur du métatarse. Comme chez les autres espèces du groupe, la cellule radiale est très fortement tronquée à l'extrémité et la 3e cellule cubitale large et peu étirée (fig. 82).

♂. 5,5 mm. Noir, sauf une zone ferrugineuse sur les mandibules et une tache jaunâtre à l'extrémité des scapes. Pilosité comme chez la ♀, mais un peu jaunâtre.

Clypéus ressemblant à celui de la ♀, mais à aire apicale moins nettement limitée. 2e article du funicule un peu plus court que le 3e, 2 fois plus long que large. Face comme chez la ♀. Vertex à ponctuation un peu moins dense que chez celle-ci ; la distance interoculaire est un peu inférieure à la longueur des 3 premiers articles du funicule. Ponctuation du thorax un peu moins dense que chez la ♀ ; les mésopleures un peu plus brillantes, avec de petits espaces entre les points. Striation longitudinale de la face dorsale du propodéum beaucoup moins régulière que dans l'autre sexe. Abdomen mat ; tous les tergites avec une ponctuation très fine et dense. Echancrure des fémurs antérieurs très peu accusée ; articles des tarses allongés, comme chez *brevipennis*.



Tachysphex imperfectus

Fig. 81 : ♀, vue de profil. — Fig. 82 : extrémité de l'aile antérieure. — Fig. 83 : volsella. — Fig. 84 : crochet.

Armature génitale : La figure 83 représente la volsella, qui ressemble beaucoup à celle de *brevipennis*.

T. imperfectus se distingue des autres *Tachysphex* noirs par les caractères généraux du groupe, en particulier l'absence de suture épisternale.

La ♀ se distingue de celle de *brevipennis* par son abdomen noir, ses antennes ferrugineuses à la base, son aire pygidiale mate; le ♂ s'en distingue par son aspect plus robuste, sa sculpture plus forte, ses pattes noires.

J'ai étudié 1 ♀ de Biskra, 18.VI.1911 (coll. Morice, Muséum d'Oxford), désignée comme type; 1 ♀ de Tunisie : Sfax, 19.V.1913 (coll. von Schulthess); 1 ♀ des environs du Caire (coll. Mochi) et 1 ♂, désigné comme allotype, de Suez, 11.VI.96, déterminé *aegyptiacus* par Morice (Muséum de Vienne).

SOUS-GENRE *HOLOTACHYSPHEX* DE BEAUMONT

Si les espèces du groupe de *brevipennis* se relient étroitement aux autres *Tachysphex*, il n'en est pas de même pour *holognathus* Morice et pour une espèce voisine, encore indédite, de l'île de Rhodes. Les principaux caractères distinctifs de ce sous-genre sont :

Les mandibules ne sont pas échancrées à leur bord inférieur, mais régulièrement arquées (fig. 88); les tarses antérieurs de la ♀ sont dépourvus de peigne; le premier tergite et la base du 2e sont beaucoup plus nettement carénés sur les côtés que chez toutes les autres espèces. L'abdomen est distinctement et fortement ponctué.

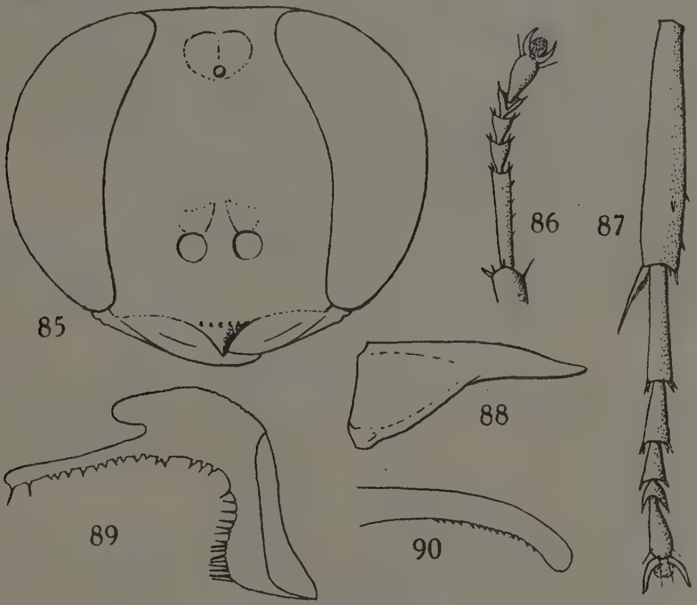
Par ces derniers caractères, le sous-genre *Holotachysphex* se rapproche des *Prosopigastra*; par la structure des mandibules, il forme le pendant du genre *Holotachytes* Turner dans le genre *Tachytes*.

Type du sous-genre : *Tachysphex holognathus* Morice.

Tachysphex (Holotachysphex) holognathus Morice
(= integer Morice nec Kohl)

♀. 7-9 mm. Noire; la face interne des tibias 1, l'extrémité des tibias 2 et tous les tarses plus ou moins brun-jaunâtre; bord postérieur des tergites 1-5 largement décoloré. Ailes peu enfumées, les antérieures avec une étroite bordure un peu plus foncée. Tête et thorax recouverts d'une pilosité argentée longue, couchée sur la partie inférieure de la face, où elle cache la sculpture, plus ou moins dressée et laissant apercevoir les téguments des autres zones. Les tergites abdominaux portent une pilosité dressée sur le disque, couchée sur les côtés et sur les dépressions; le 2e sternite montre aussi une pilosité assez dense.

Pièces buccales courtes; mandibules sans échancrure (fig. 88); clypéus brillant, très peu ponctué dans sa partie inférieure, terminé par une pointe aigue (fig. 85). Antennes courtes; le 2e article du funicule à peine 2 fois aussi long que large, plus court que le 3e; les articles suivants un peu plus de 2 fois aussi longs que larges. Tubercules supra-antennaires très brillants, grands, se réunissant presque sur la ligne médiane. Tête brillante avec une ponctuation beaucoup plus forte que chez n'importe quel autre *Tachysphex*, moyennement espacée. Tubercule ocellaire divisé par un sillon. Vertex horizontal, avec une impression en forme de ligne transversale ; la distance interocellaire est un peu plus grande que la longueur des articles 2 et 3 du funicule. Tempes assez développées. Mésonotum, scutellum et mésopleures à ponctuation aussi forte que la tête, mais plus espacée, les espaces plus grands que les points. Propodéum brillant, irrégulièrement reticulé, arrondi en arrière ; sa face postérieure avec une petite fossette lisse dans le haut. Tergites abdominaux brillants et ponctués ; sur le premier, la ponctuation est forte et espacée, les espaces, au milieu, plusieurs fois plus grands que les points ; sur les tergites suivants, la ponctuation devient plus fine et plus indistincte. 6e tergite brillant, avec quelques points pilifères, convexe, sans aire pygidiale nettement définie. Le premier tergite est nettement caréné sur ses côtés, le 2e également avec une fine carène dans sa moitié antérieure. Sternites moins brillants que les tergites, le 2e à ponctuation assez forte, dense sur les côtés, espacée au milieu, les suivants à ponctuation beaucoup plus espacée. Pattes courtes et très peu épineuses (fig. 87) ; les tarses antérieurs entièrement



T. holognathus :

Fig. 85 : tête de la ♀, vue de face. — Fig. 86 : tarse antérieur de la ♀. — Fig. 87 : patte postérieure de la ♀. — Fig. 88 : mandibule. — Fig. 89 : volsella. — Fig. 90 : crochet.

dépourvus de peigne (fig. 86). La cellule radiale est nettement tronquée, la 3e cubitale moyennement allongée ; la cellule anale des ailes postérieures est assez large à l'extrémité, tronquée perpendiculairement.

♂. 6-8 mm. Coloration et pilosité comme chez la ♀.

Structure et sculpture de la tête et du clypéus comme chez la ♀. 2e article du funicule 1 1/2 fois aussi long que large, les suivants 2 fois plus longs que larges, les derniers plus courts. La distance interoculaire égale ou surpasse légèrement la longueur des 3 premiers articles du funicule. Ponctuation du thorax et de l'abdomen, ainsi que la sculpture du propodéum un peu plus grossières que chez la ♀. Sternites 2-5 présentant dans leur partie médiane une plage nettement limitée, recouverte d'une très fine pruinosité couchée, brune et mate. Pattes encore moins épineuses que chez la ♀. Fémurs antérieurs avec une échancrure large et profonde, limitée du côté basal par un angle très saillant.

Armature génitale : La figure 89 montre l'aspect particulier de la volsella, caractérisée entre autres par la brièveté des soies.

T. holognathus est une espèce très nettement caractérisée et que l'on ne peut guère confondre avec d'autres. J'ai étudié une dizaine d'individus, dont les types de Morice, provenant tous des environs du Caire.

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The Beanfly *Agromyza phaseoli* Coq. in Egypt

(Diptera : Agromyzidae)

(with 8 Text-Figures)

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Varieties of beans, local and introduced, were planted in the farm of the Faculty of Agriculture at Giza in August and September 1939. Dr. K. Stino, in charge of the truck-crop section in the faculty, noticed that a very large proportion of the plants in their early stages of growth began to wilt and die. Replanting was then necessary, which in turn was also atacked. Specimens were referred to the writer for examination and advice as to control measures.

On examination of the wilty plants many dipterous larvae and pupae were found in the stems. When these were reared, the fly was found to belong the family *Agromyzidae*.

In the same season, complaints of the wilty condition of the plants from bean growers in different parts of the country were received by the Ministry of Agriculture. The growers also asked for advice regarding the nature of the « disease » and control measures that might be taken.

In an attempt to bring about all the information regarding this insect, the writer has reviewed the literature, and studied its life-history and nature of damage in the field and in the laboratory. Control measures were tried with satisfactory results in the estates of the faculty at Giza in 1941. The results of this study are given in this paper.

Thanks are due to my colleage Dr. K. Stino for his collaboration in the application of control measures, and his study of the degree of damage to the different varieties of beans, in an effort to find out, if any of these varieties would have some degree of resistance to the attack of the fly. The importance of this, is of course evident; by selection and breeding, a new variety might be established that would have the desired characters among which the resistance, at least partial to the attack of the fly.

Historical

Willcocks (1922) in his « Survey of the more important economic insects and mites of Egypt », has recorded the following :

« Recently my attention has been called to a maggot, the larva of the bean stem fly which tunnels in the stem of French bean plants. This is probably an *Agromyzid*. At present we know nothing about this insect except that it is parasitized by a very beautiful slenderly built Chalcid of a metallic emerald green colour ».

Since then no reference to the fly appeared in the literature in Egypt.

Identification of the Fly

In the second edition of my book on the « Insects of Economic Importance in Egypt », published in Arabic in 1943, I considered this fly as being *Agromyza phaseoli*, although similar flies in the collection of the Egyptian Ministry of Agriculture and reared from beans in 1935 were identified as *Melanagromyza cunctans* Meig. The verification of my identification was handicapped by the difficulty of sending material to specialists abroad in war time, and of obtaining, in this country, the publication in which the original description was to be found. Dr. A. Azab of the department of entomology in this faculty, who was then on educational mission in England, was kindly asked to copy there the description. This was done and the description was sent to me at the end of 1944 and will be quoted later. In 1946, however, specimens of the fly were at last submitted to the U. S. Natioanl Museum in Washington for identification. It was confirmed by Mr. C. T. Greene as being undoubtedly *Agromyza phaseoli* Coq.

World Distribution

This fly has been recorded in Australia, New Zealand, East India, Ceylon, East Africa, and Belgian Congo.

In Egypt, it is probable that it is found wherever the French beans are grown. The writer has recorded it from Giza, Dokki and many other places near Cairo, the Barrage district, Belbeis (Sharkia), Zefta (Gharbia), and Sids (Beni-Swef).

Nature of Damage

In Egypt, French beans are sown annually, in tow crops ; the autumn crop in August, September and Octcober, and the spring one in February and March. The autumn crop is the one that is heavily infested, especially in October. The attack begins as soon as the plants appear above the ground. The damage done to the plants is clearly observed in the field in the final stages of the infestation, the plants become stunted and yellow and finally topple over. The stem just beneath the soil becomes swollen, then cracks and gets brown in colour. When such plants are pulled and examined, fully grown larvae, and pupae are easily seen in the damaged part of the stem at the surface of the ground or a little above or below it. Replanting in such cases may be necessary in August and September. The death of the infested plants depends upon the number of larvae tunnelling through it. Many plants which appear normal in their growth may harbour a small number of larvae. Dead plants 20 cm. long were found to harbour as many as 25 larvae and pupae. Some plants may succumb to 10 or 15 larvae. If the plant is able to form adventitious roots it may recover and in this case cropping is not affected. Old plants examined all through December and January show larvae in the fleshy joints of the branches and the leaf stalks. These larvae usually pupate in the same places. Material of these plants were put in cages for rearing adult flies. These continued to emerge through January to March. It is to be noticed that the new spring crop starts to grow around the middle of February. However, examination of the plants did not show any infestation. On April 20th 1941 the writer received specimens of plants of Smyrna cowpeas (lobia) from the Barrage district grown on April 7th, which revealed few eggs and larvae. This shows that

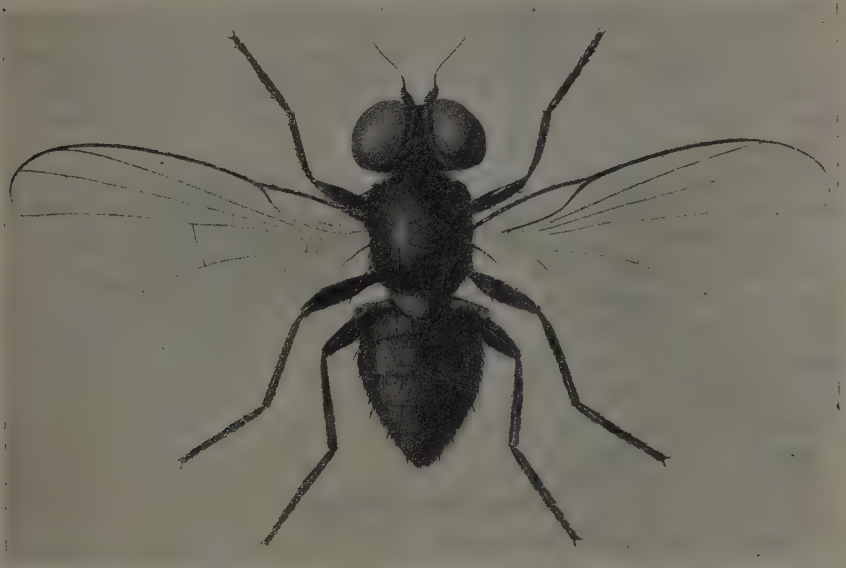

Fig. 1. — The Beanfly (*Agromyza phaseoli* Coq.), much enlarged.

lobia and possibly other leguminous plants carry over the infestation through the summer. The writer found larvae in September in lobia and lima-beans.

Description of the Adult

The fly (fig. 1) is small in size, measuring about 2.5 mm. in length, shiny black with reddish eyes.

To make more available the original description of the fly as given by Coquillet on type specimens forwarded to him by Frogatt from Australia, the present writer finds it advisable to give it here. This description seems incomplete and it remains for a specialist on the group to revise it. Coquillet description reads as follows :

« Black, including the halters. Front on the sides opaque, the triangle highly polished, almost reaching the lower end of the front. Body strongly tinged with blue, polished, not light coloured, pruinose on any of its parts; thorax bearing two pairs of dorso-central macrochaetae. Wings hyaline, costa strongly thickened beyond the apex of the first vein, small cross-vein distinctly beyond the middle of the discal cell, hind cross-vein at three-fourths of its length beyond the small apex of the third vein midway between the apices of the second and fourth veins.

None of the tibiae nor of the tarsal joints noticeably dilated or swollen. — Length 1.5 mm. »

Biology and Life-History

During the peak of infestation, the flies could be seen in large numbers in the field under the sunlight moving actively on the leaves. The female punctures the upper cuticle of the leaf with its enormous ovipositor (fig. 2), probes inside the spongy tissue and lays only one egg leaving the opening of the puncture open. The female lays other eggs in the same area. The flies seem to feed on the juives oozing out of the broken cells. The base of the blade is a preferable place for egg-laying, but eggs may also be laid at the tip and sides. Such areas may be easily detected if the blade is held between the eye and the light. When examined under a high power lens, the eggs could be seen embedded within the spongy tissue just beneath the cuticle. The egg is pearly white in colour, oval in shape, measuring about 175×345 μ (fig. 3).

The life-history of the fly was studied at Giza during October and the first half of November. The stages from egg to adult were under observation daily in attacked plants 15 cm. height with only two leaves besides the cotyledons. Larvae were traced after hatching out from the egg, mining actively about in the blade of the leaf, reaching the mid-rib which it followed inside or alongside towards the stalk. This is done in one day. The activities of the larva in the following few days could be easily traced to the end of the tunnel where the larva itself may be found. The cuticle of the plant under which the larva mined is light green in colour and when raised, black particles of excretions are the signs to be followed. The full-grown larva is of the muscoid type creamy white in colour and measures 4 mm. in length (fig. 4). On the 7th day fully grown larvae 4.25 mm. long were at the collar region of the stem and started to pupate on the 9th day. The puparium (fig. 5) is dirty white at first, later becoming yellow to brown in colour and measures about 3 mm. in length. The pupal stage

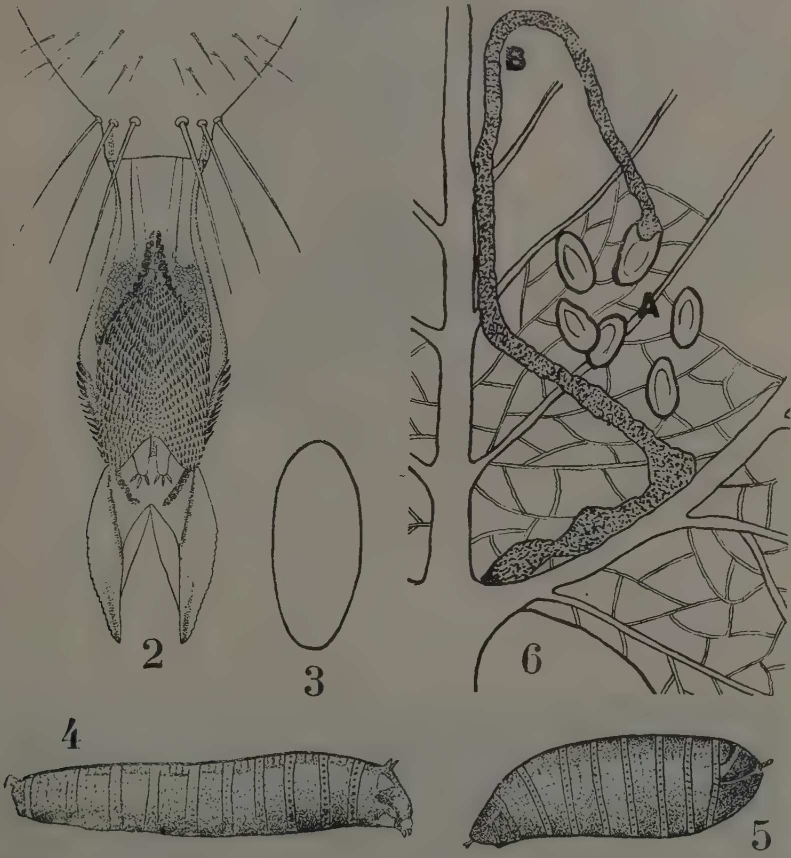

Fig. 2 : Ovipositor. — Fig. 3 : Shape of the egg. — Fig. 4 : Full-grown larva. — Fig. 5 : Puparium. — Fig. 6 : A. Base of a bean-leaf showing places were eggs are inserted; B. Gallery or mine done by the larva. [much enlarged].

lasted 9-12 days. The complete life-cycle during October and the first half of November required 17 days.

Food Plants

This insect was recorded on French beans, lobia (cowpeas) and lima beans, but other host plants in the literature are species of *Dolichos* and *Crotalaria*. It may be harboured by other leguminous plants.

Control

In the fall of 1941, the writer carried out an experiment based on Morgan's recommendations for the control of the Beanfly using white oil-nicotine mixture. The white oil used was Volck and light citro-oils. The experiment was carried out with the co-operation of Dr. Stino. The results were satisfactory and encouraging. Some changes were made in the concentration of the oil and the nicotine sulphate with varying results. The formula giving best results, bearing in mind the economic side of the problem, is the one containing 1.5 % white oil and 2 ‰ nicotine sulphate. The first application should be applied 4 days after the first plants show through the ground, with 4 applications at weekly intervals. Cutting this interval down to 4 days with more applications gives better results from the point of view of control, but this entails more expense, specially that the prices of oil and nicotine are now high and also labour.

The plants develop adventitious roots overcoming any damage that may have happened to the main root. This development of roots is assisted by hilling around the plants. When such plants which seem to grow normally are examined, few larvae may be found but they are so few in number that their damage to the plant is insignificant.

Varietal Resistance

Dr. Stino made observations on about 38 varieties. Some varieties succomb easily to the attack, while some others show resistance in variable degree. Early Mohawk is apparently the most resistant. It is recorded as « no infestation », but larvae may still be found in very small numbers. The results of spraying show « 80-100 % » control except in the Sudanese variety which shows only 40 %. These results are not encouraging, and spraying will have to be resorted to for years to come.

Parasites

Two species of Chalcids were reared, one of which is the emerald green chalcid mentioned by Willcocks and other investigators in other countries. They were identified by Mr. A. B. Gahan of the U.S. National

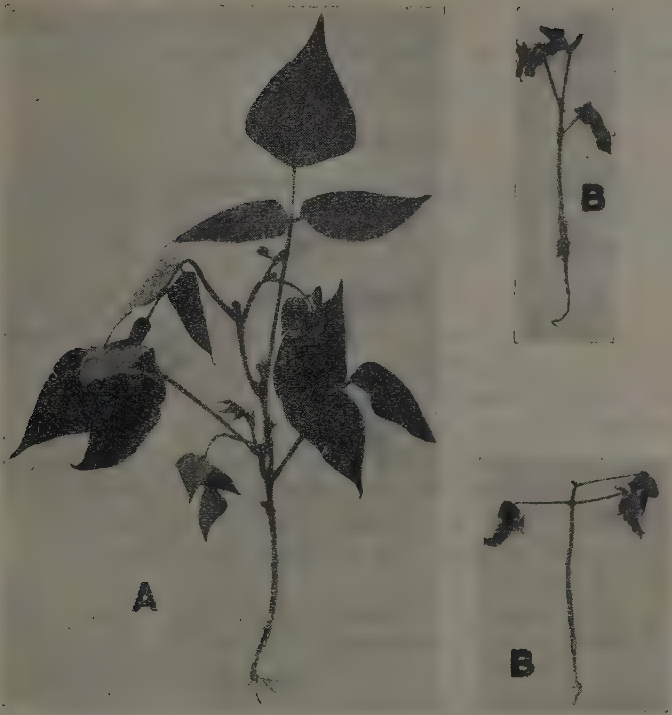

Fig. 7. — Control of the Beanfly : A. Sprayed plant, and B. Unsprayed plants, both sawn at the same time.

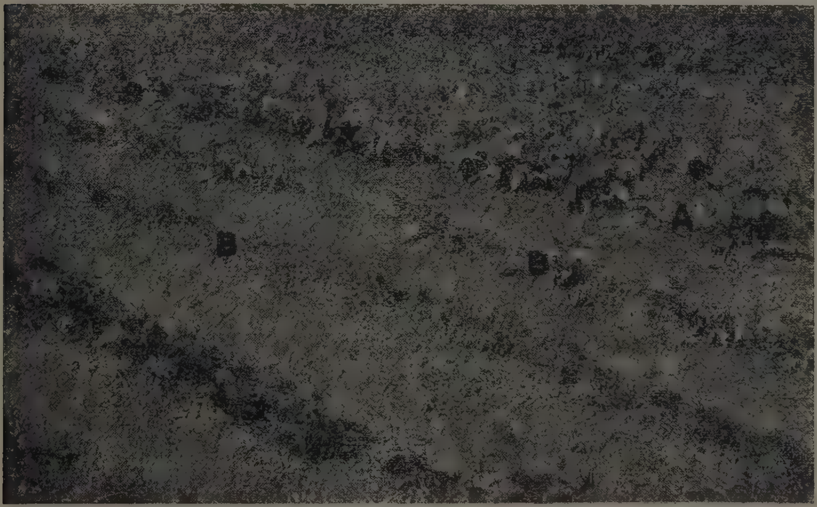

Fig. 8. — Control of the Beanfly : A. Sprayed row, and B. Unsprayed rows.

Museum, Washington, as *Trigonogastra agromyzae* Dodd (Pteromalidae), and *Eurytoma larvicola* Ginault (Eurytomidae). These parasites are most active from September to December.

ACKNOWLEDGMENT

Thanks are due to Mr. R. Strekalowski for the drawing of the adult fly, and to Assaad Eff. for the drawings of the ovipositor, larva and puparium.

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The Biology and Life-History of *Apanteles ruficrus* Hal.

[Hymenoptera-Braconidae]

(with 9 Text-Figures and 6 Tables)

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INTRODUCTION

Apanteles ruficrus Hal. is a gregarious internal parasite of many Noctuid larvae, *Agrotis ypsilon*, *Leucania loreyi*, *Plusia* spp., and many other moth larvae are among its important hosts in Egypt. It ranks second only to *Gonia capitata* de Geer (Diptera-Tachinidae) as the most important parasite of *Agrotis ypsilon* in the country. These Noctuids represent a very important group of our pests, and a knowledge of the factors that contribute to their control is deemed desirable.

ACKNOWLEDGMENTS

I wish to thank Dr. A. A. Moursi, Senior Entomologist of the Parasites Laboratory, under whose supervision this work was done, for encouragement, criticism and suggestions. I am also indebted to Mr. A. Botros, Senior Artist of the Entomological Section, for help in drawings signed by him, and to M. Abdulmonem and Abdulmoti, laboratory assistants, for help in host and parasite breedings.

SYNONYMY

This species was first considered by Haliday (1834) as belonging to the genus *Microgaster*. Reinhard (1880), however, places it under the genus *Apanteles*.

The following are the synonymies and the bibliography of *Apanteles ruficrus* to my knowledge :

Bull. Soc. Fouad I^{er} Entom., XXXI, 1947. [225].

Microgaster ruficrus Haliday, 1834, *Ent. Magazine*, II, p. 253.
Apanteles ruficrus Reinhard, 1880, *Deutch. Ent. Zeit.*, XXIV.
Apanteles ruficrus Marshall, 1885, *Trans. Ent. Soc. Lond.*, p. 166.
Apanteles antipoda Ashmead, 1900, *Proc. Linn. Soc. N.S. Wales*, XXV, p. 355.
Apanteles manilae Ashmead, 1904, *Journal N.Y. Ent. Soc.*, XII, p. 19.
Apanteles ruficrus Szepligeti, 1904, *Gen. Ins.*, f. 22, p. 108.
Apanteles sydniensis Cameron, 1911, *Proc. Linn Soc. N.S. Wales*, XXXVI, p. 342.
Apanteles narangae Viereck, 1913, *Proc. U.S. Nat. Mus.*, XLIV, p. 642.
Apanteles ruficrus Lyle, 1916, *Entom.*, XLIX, p. 161.
Apanteles antipoda Wilkinson, 1928, *Bull. Ent. Res.*, XIX, p. 95.
Apanteles ruficrus Gahan, 1928, *Bull. Ent. Res.*, XIX, p. 256.
Apanteles ruficrus Wilkinson, 1929, *Bull. Ent. Res.*, XX, p. 108.
Apanteles ruficrus Watanabe, 1932, *Ins. Mats.*, VII, 1-2, p. 79.

DESCRIPTION OF THE ADULT

The earliest description of the parasite available to the writer is that of Marshall (1885). The following is his description of the species :

« Black ; palpi testaceous ; squamulae, belly at the base and legs, rufo-testaceous ; hind coxae more or less, and tips of the hind femora, black ; hind tarsi, and often the tips of the hind tibiae fuscescent. Wings subhyaline, iridescent ; stigma pale fuscous. Mesothorax and scutellum thickly punctate, dull ; pleura the same, with a smooth space beneath the wings. Metathorax rugulose. Segment 1 twice as long as broad, with parallel sides, truncate rugulose, 2 broader than 1, as long as 3, narrowed anteriorly, also rugulose ; the rest smooth and shining. Terebra excerted, very short. Ventral valve somewhat surpassing the anus. Hind coxae alone rugulose, bristly. Female and male length, 1 1/4 ; wings, 2 1/2 lin.

Sometimes the apical half of the hind femora is infuscated. The abdomen of the female is acuminate, with the terebra visibly protruding. The third segment is occasionally margined with rufous at the apex, or there are two rufous spots at the hind angles (examples of both have been taken by Bignell) ».

GEOGRAPHICAL DISTRIBUTION

The species is widely distributed. It occurs in the Palearctic, Ethiopian, Oriental and Australian zones. It does not seem to occur in the Nearctic or Neotropical regions. It has been reported from :

Africa : Egypt, Sudan, and Italian Somaliland.

Asia and Australasia : Astrachan, India, Coimbatore (South India), Ceylon, China, Celebes, Fiji, Formosa, Java, Japan, Korea, Manchukuo and Philippines.

Australia : Queensland and New South Wales.

Europe : Checoslovakia and Russia.

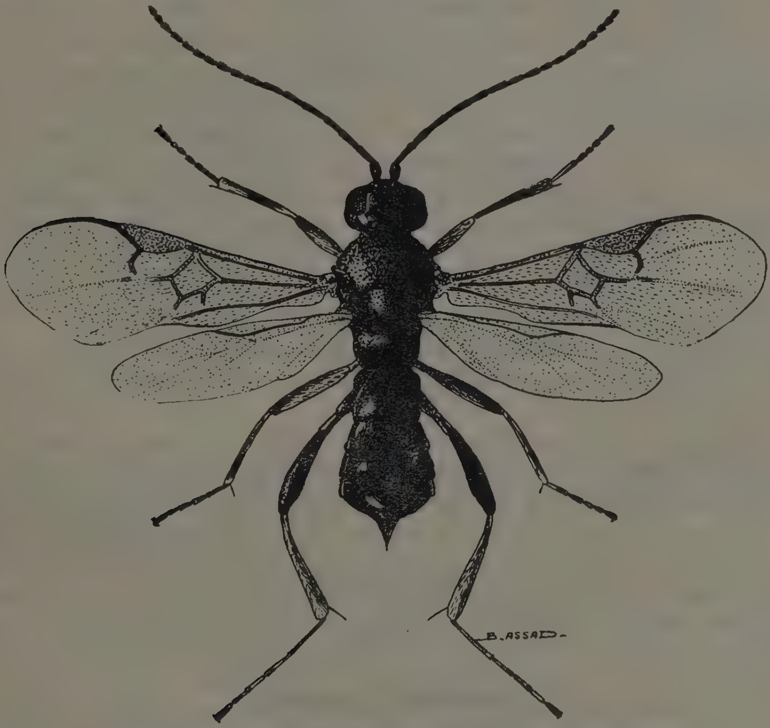


Fig. 1. — *Apanteles ruficrus* Hal., adult female, × 25.

The parasite was introduced in Hawaii, in 1942, for the control of the corn earworm (*Heliothis armigera* Hbn.).

In Egypt, the species seems to be well distributed both in Lower and Upper Egypt (Bishara, 1932). It was collected by the writer from :

Lower Egypt : Kaliubia, Sharkia, Menufia, and Gharbia ; Cairo and neighbourhood.

Upper Egypt : Giza, Beni-Suef, Fayum, Minia, Assiut and Guirga.

It is abundant in localities where its main host, *Agrotis ypsilon*, prevails, being most abundant in regions of greatest incidence of the pest from Giza to Assiut.

HOST PREFERENCE

The genus *Apanteles* is limited in its host preference mainly to Lepidoptera, and no species of this order in the Temperate Zone seems to be free from an *Apanteles* spec. attack. Few *Apanteles* spp., however, are recorded as parasites of other orders than Lepidoptera such as Coleoptera, Hymenoptera, Diptera and Neuroptera.

The following species are reported as hosts of *Apanteles ruficrus* :

Noctuidae : *Agrotis ypsilon, Heliothis armigera, Heliothis obsoleta, Leucania loreyi, Leucania unipunctata, Naranga diffusa, Perigea capensis, Plusia* spp., *Prodenia litura, Sesamia cretica* and *Spodoptera mauritia.*

Pyralidae : *Hypsipyla robusta* and *Phlyctaenodes sticticalis.*

The parasite emerged in numbers from the following host species from material collected by the writer in the field at different seasons of the year :

Agrotis ypsilon, Agrotis spinifera, Plusia gamma, Plusia circumflexa, Leucania loreyi, Sesamia cretica and *Laphygma exigua.*

Willcocks (1937) attributes to this parasite an important role in the control of *Agrotis pronuba, Agrotis ypsilon* and *Leucania loreyi* and keeping them in check.

In spite of extensive field collections of larvae of *Prodenia litura* over a period of eight years, no parasites were seen to emerge from material thus collected. Females of the parasite, however, deposited eggs in *Prodenia* larvae when confined with them in glass vials. The host insects were not able, however, to complete their development and all died within a period of five days. Under the circumstances, the statement by Sonan (1937) that the parasite was noted to emerge from *Prodenia* larvae is rather doubtful.

LABORATORY BREEDING

It was necessary to find out the easiest and most efficient method of breeding both the host and the parasite in the laboratory in order to make a thorough study of the biology of the parasite. The following method proved most satisfactory :

Host rearing

Agrotis ypsilon and *Laphygma exigua* were found most convenient for rearing the parasite. Moths are confined in wooden oviposition cages 30 × 30 × 30 cms. All sides of the cage with the exception of its wooden bottom and its glass door are made of fine screen wire. A water bottle with clover, cotton or corn sprigs is placed in each cage. Eggs are laid singly, in case of *Agrotis*, or in small batches, in case of *Laphygma*, generally on leaves of the plant.

Deposited eggs are then transferred to breeding cages. The latter resembles those used for oviposition. Plant sprigs are changed daily in the breeding cages to provide the developing larvae with fresh healthy food. When larvae are about to pupate, the water bottle is removed and saw dust is placed at the bottom of the breeding cage to provide a suitable medium for their pupation. Emergence of moths will soon follow.

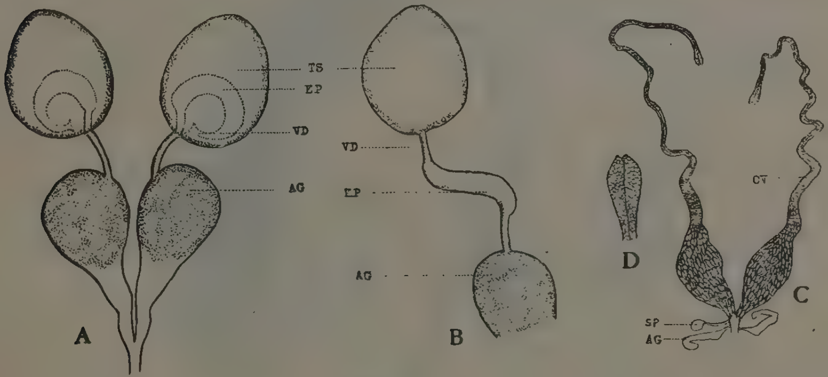


Fig. 2. — Male and female reproductive systems: A. Male reproductive system; B. Same with epididymis unraveled; C. Female reproductive system; D. Germarium highly magnified.
AG. Accessory gland; EP. Epididymis; OV. Ovariole; SP. Spermatheca; TS. Testis; VD. Vas deferens.

Parasite rearing

Host larvae at the required stage of development, about one cm. long in case of *Agrotis*, are exposed singly for few seconds to five mated parasite females, in small vials 12 × 4 cms. As soon as eggs are deposited, host larvae are removed and placed in breeding cages and fresh host larvae are exposed to the parasites. Parasitised host larvae are allowed to develop in the breeding cages until the parasites have pupated. Parasite cocoons are then placed in small vials provisioned with honey which serves as food for adults after their emergence. Adult parasites mate on emergence and consequently are used for breeding purposes. In absence of suitable host larvae, adults are kept in cold storage at a temperature ranging from 6 to 10° C.

When *Agrotis* rearing becomes difficult during the summer months, *Laphygma exigua* and *Sesamia cretica* are used as hosts instead.

DESCRIPTION OF THE IMMATURE STAGES

The egg (fig. 3 B) is elongate and pyriform, round at the cephalic end and tapers posteriorly to a short peduncle about 9 μ long. The chorion is thin, transparent and has no surface sculpturing. Soon after deposition, the egg measures about 133 μ long and 40 μ at its widest part. As development proceeds, the egg changes both in shape and size. The cephalic end becomes more swollen and the egg assumes a kidney shaped appearance (fig. 3 C).

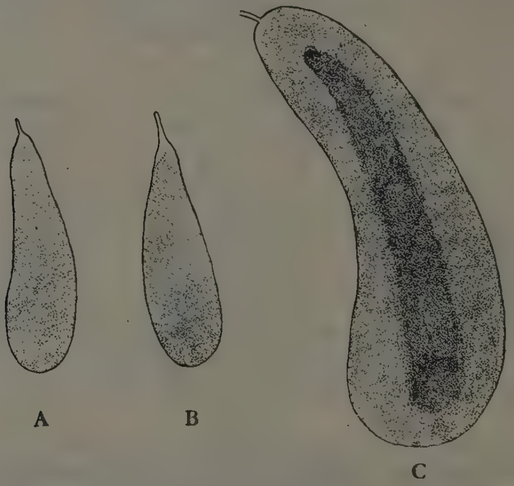


Fig. 3. — A. Mature ovarian egg; B. Egg just laid; C. Egg 3 days old.

A series of measurements was taken of a number of eggs at various stages of development, the following were the average lengths and widths :

AGE OF THE EGG	LENGTH IN μ	WIDTH AT THE WIDEST PART IN μ
Just laid..........	133	40
2 days old	190	55
3 days old	285	86
5 days old	560	250 Just before hatching

This Table shows that during the incubation period the egg increased about 4 times in length and 6 times in width.

Immediately after deposition the egg contents are homogenous. As development proceeds, a deep yellowish zone appears along the central part and the outline of the embryo is marked until few hours before hatching one could easily discern the larva, its broad head and its small caudal evagination which is to become the anal vesicle (fig. 4 B). The embryo is completely wrapped in a cellular membrane, the trophic membrane, which persists after hatching.

The larval stages

The first instar larva

The newly hatched larva (fig. 4 C) measures about 540 μ in length and 90 μ in breadth. The embryonic membrane, trophamnion, persists as an envelope completely enclosing the larva. This membrane persists also through the second larval instar. It is believed that this membrane plays a certain role in nourishing the larva by absorbing and elaborating food materials from the host tissues and acting as a means of transferring such products to the parasite larva.

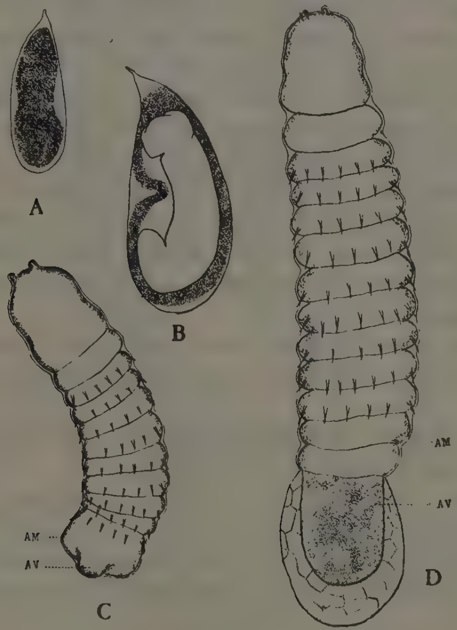


Fig. 4. — A. Egg 4 days old; B. Egg 5 days old, just before hatching; C. First instar larva, just after hatching; D. Advanced first instar larva, 4 days old.
AM. Amniotic membrane; AV. Anal vesicle.

The head is comparatively large and slightly broader than the body, being about 130 μ long and 110 μ wide. It carries a pair of short papillate antennae on its anterio-latero-dorsal surface. On its ventral surface, the head carries a pair of sickle shaped, sharp pointed mandibles which are darker and more sclerotised at their distal ends. Each mandible is about 38 μ long (fig. 6 F).

Just after hatching, the body consists of 10 body segments. The last segment is more than twice the size of any other segment. On the dorsal and laterodorsal surface of each segment from the second to the tenth, there is found a row of spines. The first segment, however, is distitute of any spines.

Towards the end of this stage, the tenth segment is divided into three distinct segments and thus the larva consists of twelve segment (fig. 4 D). The two new segments, eleventh and twelvth, bear no spines. The anal vesicle, which appeared as small evagination in the embryo, gradually increases in size and assumes a bladder-like form. Towards the end of the stage, the vesicle attains its full size. It is an evagination of the wall of the hind gut that is prolapsed through the anus. Its function has been the subject of much discussion by various investigators. It is concluded that it plays a certain role in respiration. Thorpe (1932), however, believes that it cannot be responsible for more than about one third of the total oxygen uptake, and much of this may perhaps be associated with its own oxygen requirements. Gilmore (1938) is of the opinion that it may serve as an excretal receptacle.

The alimentary system is simple and consists of a narrow pharynx which opens into a blind sac, the stomach. The hind gut is evaginated to form the anal vesicle.

The short anal horn which characterises the first instar larva of many of the Microgasterine is wanting in this species.

There are no visible tracheae or spiracles. Respiration seems to take place mainly through the skin.

The larva gradually increases in size until at the end of this stage it reaches a length of about 2,8 mm. and a width of about 0.5 mm.

The second instar larva

Early in this stage, the larva (fig. 5 A) measures about 3.6 mm. in length (anal vesicle included) and 1.3 mm. in width. The anal vesicle alone is about 0.5 mm. long. At the end of this stage, however, the larva measures about 4.5 mm. in length. (fig. 5 B).

Throughout this stage, the trophamnion still encloses the larva. The exuvium of the first instar larva appears as a narrow brown ring around the body of the larva at its posterior part just in front of the anal vesicle under the embryonic membrane. The hard parts of the head of the first instar larva, however, do not show in the exuvium.

The head is comparatively small and in contrast to the first stage it is a little bit narrower than the body. Early in the stage, the mandibles are very hard to discern due to the lack of pigmentation. Late in the stage, however, the mandibles could be seen. They are softer and less pigmented than those of the first and third instars. Each is about 76 μ. The tip alone is 47 μ (fig. 6 G).

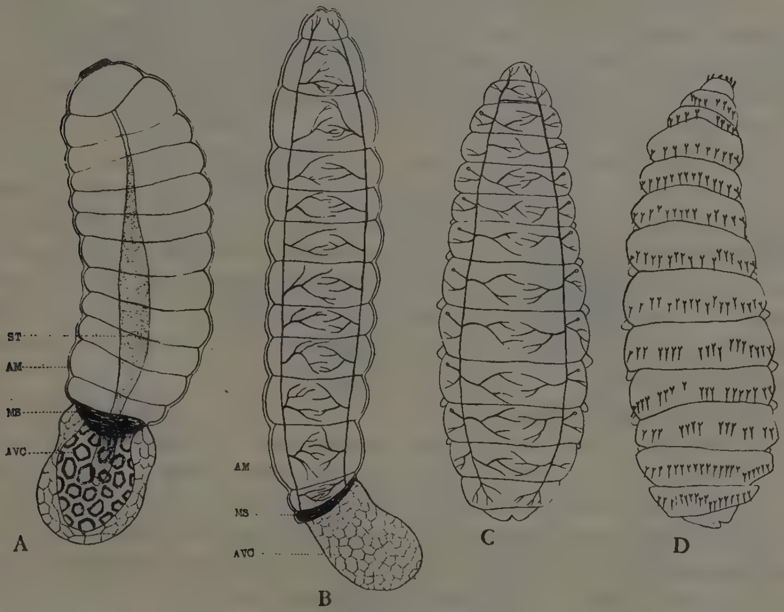


Fig. 5. — A. Second instar larva, 6 days after hatching; B. Second instar larva, 8 days after hatching, showing respiratory system; C. Third instar larva showing respiratory system; D. Third instar larva showing dorsal spines.
AM. Amniotic membrane; AVC. Anal vesicle cell; MS. Moult skin of first instar larva; ST. Stomach.

The alimentary canal consists of a narrow tubular pharynx which dilates into a longitudinal blind sac, the stomach.

The salivary glands are well developed at this stage. They are thrown into series of loops that fill most of the body cavity.

The respiratory system (fig. 5 B) consists of two lateral longitudinal trunks that extend along the sides of the body. The two trunks are connected with a dorsal transverse commissure at the posterior part of the first thoracic segment. The ventral transverse commissure in the posterior part of the body which is met with in many other species is wanting. In each body segment each longitudinal trunk gives off a pair of tracheal branches : one dorsal and one ventral. These branches are divided and subdivided into finer tracheoles which form a net work that fills a good part of the body of the larva. No spiracles, however, can be seen.

The third instar larva

A short period before leaving the body of its host, the larva undergoes its second moult. In this process the larva rids itself off the exuvium of the first instar that persisted throughout the second instar as a narrow ring around the body, as well as the trophic membrane which surrounded the whole body during the two preceeding instars.

Parasite larvae make their way out through the narrow holes they make in the body wall of their host. Most larvae make their way out through the lateral sides of the host, few others make their way out through the dorsal or ventral sides. Each parasite larva leaves the host body through a special hole. Around each hole the host skin is stained dark brown. Small amounts of body fluids exude through each hole. The exuviae of the second instar larvae appear through these holes after the third instar larvae have made their way out.

The third instar larva is creamy white in colour, almost cylindrical in shape; it tapers slightly towards the anterior end. It consists of the head, three thoracic and nine abdominal segments. It is about 3.16 mm. long and 880 μ at its widest part. The whole surface of the body, including the head, is minutely pebelled with trifurcate scales (fig. 6 B). The head is very small compared with the other body segments. The first thoracic segment is the largest segment of the body. It is rather coniform. There are two brown patches that show through the latero-dorsal surface of the posterior part of this segment (fig. 6 I). These patches may show, however, through the anterior part of the second thoracic segment. The colouration of these patches is a result of the pigmentation of two glands associated with the digestive system and located at both sides of the pharynx.

There are six pairs of lateral protrusions which arise from the intersegmental regions of the segments from the fifth to the eleventh. The first and last protrusions are comparatively small. It is believed that these protrusions are used to help the parasite larva leave the host body by serving as elevation points on the edge of the hole in the host integument. It is reported that in some Microgasterine these protrusions are associated with the spiracles. Such is not the case in this species.

Each body segment bears a ring of rather stout posteriorly directed spines (figs. 5 D and 6 D). These spines are denser on the dorsal than on the ventral sides.

The anal vesicle which is still prominent, though comparatively smaller in size (fig. 6 E), gradually decreases until at the end of this stage it becomes a very small structure which persists till the prepupal stage.

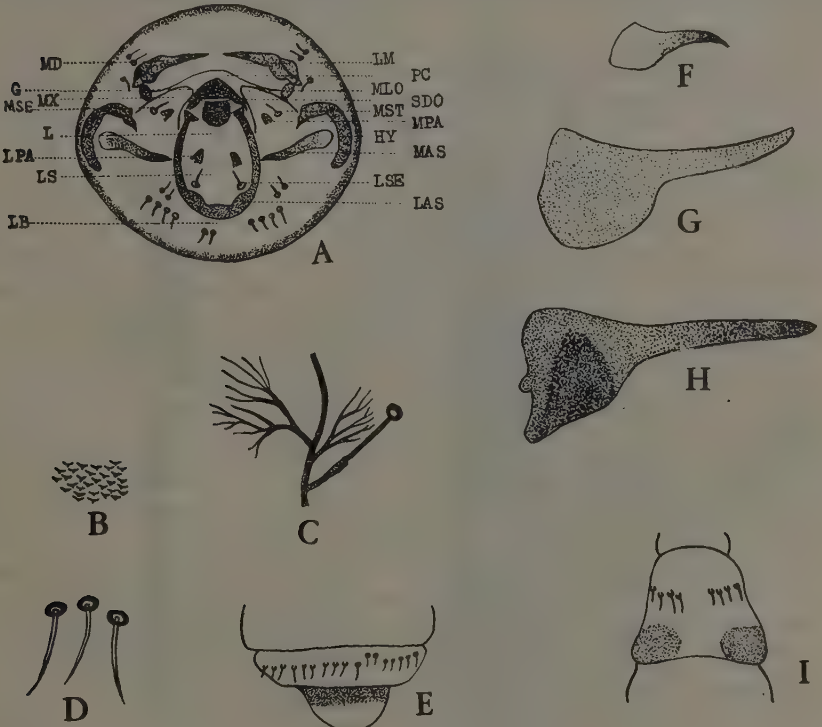


Fig. 6. — A. Head of third instar larva, frontal view; B. Trifurcate scales covering the body of third instar larva; C. Part of the respiratory system of same instar showing a spiracle; D. Cuticular spines of third instar larva, highly magnified; E. Anal end of the third instar larva just after issuing from host body showing the anal vesicle; F. Mandible of the first instar larva; G. Mandible of the second instar larva; H. Mandible of the third instar larva; I. First thoracic segment of third instar larva showing the pair of coloured patches at its latero-dorsal surface.

G. Glossa; HY. Hypostoma; L. Ligular region; LAS. Labiostipital sclerome; LB. Labiobase; LM. Labrum; LPA. Labial palpus; LS. Labiostipites; LSE. Labial seta; MAS. Maxillary sclerome; MD. Mandible; MLO. Maxillary lobe; MPA. Maxillary palpus; MSE. Maxillary seta; MST. Maxillary stipes; MX. Maxilla; PC. Preoral cavity; SDO. Silk duct orifice.

The respiratory system (fig. 5 C) : The general organisation of the respiratory system has been described in the preceding instar. The main difference is the presence of eight pairs of functional spiracles. They are arranged on the mesothorax and the first seven abdominal segments.

The digestive system (fig. 7 A) : The alimentary canal consists of a narrow tubular pharynx which opens into a dilated structure, the crop. At its posterior portion, the last organ opens into the mid-gut, the stomach. The latter is a big blind sac that extends almost the whole length of the body and fills a good portion of the body cavity. The hind gut is comparatively short with two swellings along its course, the anterior swelling being

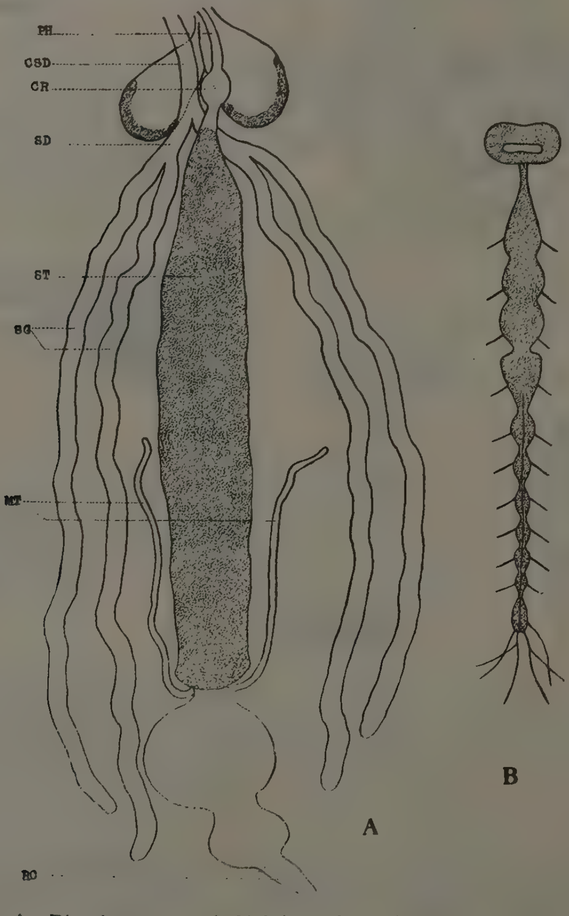


Fig. 7. — A. Digestive system of third instar larva; B. Nervous system of third instar larva.

CR. Crop; CSD. Common salivary duct; MT. Malpighian tubes; PH. Pharynx; RC. Rectum; SD. Salivary duct; SG. Salivary glands; ST. Stomach.

much bigger than the posterior one. At the point of connection of the hind gut with the stomach there is a pair of long pearly white tubules, the malpighian tubes. Some related species have a third short malpighian tube but this tubule is wanting in this species.

Associated with the digestive system is a pair of rather globular glands surrounding the fore gut. They are pale brown-yellow in colour, and each bears a dark brown patch on its posterior part. The function of these glands is not known.

The salivary glands are two in number, they are coiled and tubular in form and pearly white in colour. They surround the alimentary canal and fill most of the body cavity. Each gland consists of two long tubes that unite anteriorly to form a common duct. The common ducts of the two glands unite still further anteriorly to form a main common duct which runs ventral to the pharynx to open on the floor of the mouth.

The nervous system (fig. 7 B) consists of two spherical cerebroidal ganglia, the brain, situated in the head dorsal to the alimentary canal and of a ventral nerve cord which extends ventral to the alimentary canal along the mid ventral line. The ventral nerve cord consists of eeeven ganglia, 3 thoracic and 8 abdominal. The ganglia are connected by paired longitudinal cords, the connectives. In the abdominal region, the connectives are separate and distinct, while in the thoracic region they are closely approximated as to appear as a single longitudinal cord.

The thoracic ganglia are comparatively larger than the abdominal ganglia. The latter are arranged on the first eight abdominal segments and become successively smaller as they proceed posteriorly. The last ganglion, however, is exceptionally large and represents the fusion of two abdominal ganglia.

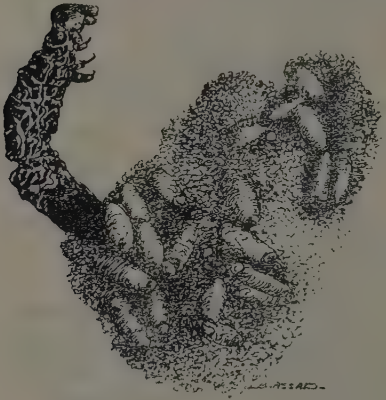
Each ganglion gives off a pair of nerves. The last ganglion, however, gives two pairs of nerves.

The head of this instar bears various cuticular thickenings and certain other structures that aid in the identification of the species. Figure 6 A shows the head and mouth parts of the last instar larva. The terms used are those used by Vance and Smith (1933).

It should be noted that the head is covered with minute trifurcate scales which give it its pebbled appearance. The maxillae, however, are very slightly pebbled. The mandibles (fig. 6 H) differ much from those of the second instar, they are bigger and more deeply pigmented. Each is about 105 μ. The tip alone is about 63 μ. On each side of the head near the base of the mandible is a number of spines. Ventrally, around the labio-stipital sclerome, another group of spines is found. The number of spines in the head differs in different individuals as well as in the same individual on different sides of the head.

The pupa

Generally, most of the parasite larvae leave their host body at the same time. It takes the parasite larva about twenty minutes to extricate itself from the host. When still about only half way out, the full grown larva begins spinning its cocoon which takes it about two hours to spin. The cocoons are loosely connected with each other and together form a pearly white mass close to or in contact with the host larva (fig. 8). The cocoon takes the form of a cylinder or imperfect spindle and is rounded at both ends. Each cocoon measures about 3 mm. in length and 1 mm. in width. Within the cocoon, the full grown larva enters a period of rest, the middle and hind guts become continuous and the stomach contents are discharged and appear as a dark mass at the posterior end of the cocoon. The larva shrinks and becomes white opaque, this is the prepupal stage.



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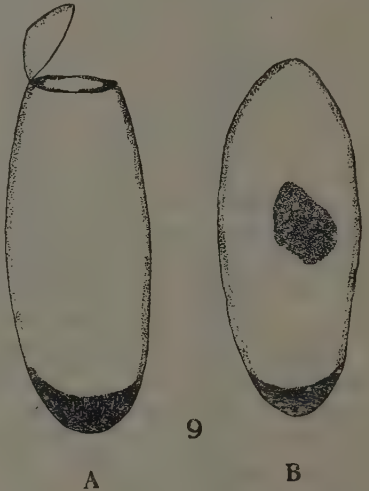

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A B

Fig. 8. — Dead parasitised *Plusia* larva (cocoon mass of the parasite *Apanteles ruficrus* Hal. is shown), × 4.

Fig. 9. — A. Cocoon of *Apanteles ruficrus* after emergence of adult parasite; B. Cocoon of *Apanteles ruficrus* after emergence of hyperparasite (Pteromalid).

After a period varying from few hours in summer to one day in winter, the prepupa changes into the pupa. The newly formed pupa is creamy white in colour. Shortly afterwards, the compound eyes and ocelli turn dark and as development proceeds the latter organs and the rest of the body get darker until, just before emergence, the whole body of the insect looks almost shiny black.

Apanteles cocoon masses were collected in considerable numbers in April and May from clover fields infested with *Agrotis*, *Plusia* and other Noctuids. In most cases, cocoon masses were seen hanging from clover and weed plants 2 or 3 cms above ground. In few instances, however, they were found buried under ground. Bishara (1932) states that cocoons may be found within the earthern cells which have been prepared by the full grown larvae of *Agrotis* for their pupation.

Apanteles cocoons should not be confused with those of *Microplitis*, a parasite of the same hosts and abounds the same localities. *Microplitis* cocoons are smaller than those of *Apanteles* and pale reddish in colour in contrast to the pearly white cocoons of *Apanteles*.

BIOLOGY OF APANTELES RUFICRUS

Emergence

When about to emerge, the adult insect forces up a cap-like operculum at the anterior end of the cocoon and thus providing an exit for the insect (fig. 9 A). All adults of one cocoon mass emerge within a period not exceeding twenty four hours. In fact most of them emerge within the first few hours. Observations made in the laboratory in April (temp. 26° C.) indicate that about 82 % of adults emerged in the first two hours and that the last adult emerged six hours later. Usually the first adults to emerge from a cocoon mass are males, females emerge few minutes later. Observations in the laboratory on one cocoon mass showed that the first female emerged twenty minutes after the emergence of the first male.

With rise in temperature in summer months, a considerable number of adults fail to emerge. Table I shows the relation between the percentage of emergence and the rise in temperature.

TABLE I

Relation between temperature and percentage of emergence

MONTH	TEMPERATURE	NUMBER OF COCOONS	NUMBER OF ADULTS THAT EMERGED	PERCENTAGE OF EMERGENCE
February	26	340	330	97.1
March	26.5	737	616	83.6
April	26.7	168	122	72.6
May	28.1	191	101	52.8
June	30.9	88	39	44.3

Copulation

Copulation takes place about half an hour after emergence. The process lasts about 15 seconds. Males and females may mate several times during their life time.

Reproduction

Before dealing with reproduction of the parasite, a study of the male and female reproductive systems may not be out of place.

The male reproductive system

The male reproductive organs (fig. 2 A and B) consist of a pair of testes which are rather ovoid or more or less spherical in shape and pale brown in colour. Each testis gives off a duct, the vas deferens, the latter becomes enlarged along its course to form the vesicula seminalis. Proximally the duct of the vas deferens forms a loop, the epididymis, which appears in close association with the posterior part of the testis. Distally the vas deferens opens into a comparatively big pyriform dark brown structure, the accessory gland. The two glands on both sides open posteriorly into a short common canal, the ductus ejaculatorius.

The female reproductive system

The female reproductive organs (fig. 2 C) consist of two ovaries of two ovarioles each. Each ovary opens posteriorly into a short oviduct. The two oviducts unite to form a short common oviduct. The spermatheca is spherical in form, brown in colour and opens by a fine canal into the common oviduct. One pair of accessory glands is present. The openings of the accessory glands into the common oviduct are posterior to the opening of the spermatheca.

Oviposition

Oogenesis takes place in the pupal stage; two days old pupae contained fully developed eggs in their ovaries. Ovaries of adult females are seen packed with fully developed eggs on their emergence. Two to three hours after emergence, the parasite female begins laying eggs. The act of oviposition is very quick and lasts on the average about five seconds with a maximum of twelve and a minimum of two seconds. In most cases the host larva responds to the sting of the parasite either by bending its head and thorax posteriorly or by wiggling and twisting its body in an attempt to ward off the ovipositing female. More often than not. these movements succeed in dislodging the ovipositing female which may then become entangled in the host body fluids that exude through the wound made by its ovipositor. The parasite may then be wounded to death by the mandibles of its victim.

It may be of interest to note that the eggs are not necessarily deposited following each insertion of the ovipositor in the body of the host. It was also observed that oviposition by a female in a certain host larva causes other females to oviposit in the same host larva in imitation.

Compared with other Braconids, *Apanteles ruficrus* females deposit more eggs per each insertion of the ovipositor. Nine females were allowed to deposit in *Agrotis* larvae. The number of eggs laid per insertion was succesively, 42, 40, 34, 34, 28, 21, 18, 8 and 6, with an average of about 26 eggs.

Females do not distinguish parasitised and non-parasitised hosts. Observations made in the laboratory showed that females would deposit more than once in the same host or in other parasitised larvae within a short interval of few hours.

Eggs are deposited in any part of the host body other than the head. Parasites deposit less often in the ventral region than in the dorsal and lateral regions of the body. In the latter regions the posterior portion is more preferred to the anterior.

It was observed by many investigators that, in association with oviposition, the females of a considerable number of Braconidae subsist largely, if not entirely, upon the body fluids of the host stage that they attack (Clausen, 1940). This was not observed in this species.

Fecundity

Twenty-six newly emerged females were isolated singly with one male each in glass vials 4.5 × 12 cms. Honey was served as food for the parasites. Each female was provided daily with three *Agrotis* larvae which were reared singly in small glass vials on clover after their removal. Host larvae that happened to die before the parasites completed their development were dissected and the parasite eggs or larvae that they cointained were counted and added to the total number of progeny of the ovipositing females.

Table II shows the results of this experiment.

This table shows that :

(1) The average number of host larvae parasitised by a single *Apanteles* female is about 5 with a maximum of 10 and a minimum of one.

(2) The average number of progeny per female is 216 with a maximum of 490 and a minimum of 13.

(3) The maximum number of eggs laid per female in a single day was 376 in this experiment.

TABLE II

Number of progeny and number of host larvae parasitised per female

FEMALE NUMBER	LONGEVITY OF FEMALES IN DAYS	NUMBER OF HOST LARVÆ PARASITISED	NUMBER OF PROGENY
1	6	8	176
2	7	5	145
3	6	5	180
4	7	7	206
5	6	3	112
6	7	1	13
7	4	5	268
8	4	3	160
9	4	3	137
10	7	2	79
11	11	10	490
12	6	4	210
13	11	6	269
14	12	8	380
15	5	6	276
16	9	6	191
17	6	4	232
18	5	4	131
19	4	4	212
20	7	6	251
21	3	5	442
22	3	2	244
23	3	2	69
24	5	3	84
25	10	8	431
26	6	5	214
Average	6.3	4.8	215.5

(4) Longevity of adult females varied from 4 to 12 days with an average of 6.3 days.

These figures do not represent the real condition in nature since very little effort on the part of ovipositing females is spent in searching for their hosts. On the other hand, owing to their confinement in small tubes, many female parasites are injured by their hosts in their attempt to sting them.

Duration of the different stages

The duration of the different stages of the parasite vary with temperature. Table III shows the duration of the different stages of the parasite at two different temperatures (in the field and in the laboratory).

TABLE III

STAGE OF THE PARASITE	DURATION IN DAYS	
	FIELD (TEMP. 1 °C)	LABORATORY (TEMP. 26.5 °C)
Incubation period.............	8	5.0
1st. larval stage...........	7	5.0
2nd. larval stage..................	4	3.5
3rd. larval stage............... ..	1	0.5
Prepupal stage.....................	1	about four hours
Pupal stage........................	12	5.0
TOTAL......	33	19

This Table shows that while the parasite completes its life cycle in 19 days at 26.5° C., 33 days are necessary for the completion of the cycle at 16° C.

Table IV represents the shortest and longest cycles of the parasite in the laboratory and the field at different seasons of the year.

TABLE IV

STAGES OF DEVELOPMENT	LABORATORY		FIELD	
	WINTER (January) TEMPERATURE 25.4 °C	SUMMER (June) TEMPERATURE 31 °C	WINTER (Jan. and Feb.) TEMPERATURE 12.3 °C.	SUMMER (June) TEMPERATURE 27 °C.
Incubation period........	5	4	9	5
Duration of larval stage ...	9	5	34	10
Duration of pupal stage...	7	3	18	5
TOTAL......	21	12	61	20

Longevity of adults

The longevity of adults depends upon several factors, the most important of which are sex, food and temperature.

Table V summarises the experiments carried out concerning the longevity of adults. It also shows that the average longevity of the males is a

TABLE V

CONDITION OF ADULTS	TEMPERATURE IN °C.	MALES				FEMALES			
		NUMBER OF INSECTS	LONGEVITY IN DAYS			NUMBER OF INSECTS	LONGEVITY IN DAYS		
			MINIMUM	MAXIMUM	AVERAGE		MINIMUM	MAXIMUM	AVERAGE
Adults kept in the laboratory without food	16.3	—	—	—	—	30	6	7	7
Adults kept in the ice box without food	13.3	20	8	12	10.5	20	10	12	11.5
Adults kept in the field provided with water and honey	12.1	20	8	28	12.5	20	9	29	17.5
Adults kept in the laboratory with water and honey	16.5	30	6	8	7	16	4	14	10
Adults kept in the field with water and honey	19.2	15	1	2	1.7	15	2	4	3
Adults kept in ice box at 12 8 °C. and removed daily for 3 hours to 16 °C. provided with water and honey	—	46	7	49	41	18	9	51	43

little bit shorter than that of females and that the shortest longevity was one day for males and two days for females when the insects were kept in the field at a temperature of 19.2° C. and provided with honey and water.

The maximum longevity was 49 days for males and 51 days for females when the insects were stored in the ice box and removed daily for short intervals of normal respiration and feeding on honey in the laboratory.

As seen in Table V, there is a correlation between longevity and the temperature at which the parasites are stored. Adult males and females lived an average of 12.5 and 17.5 days respectively when stored at 12.1° C. They lived an average of 7 and 10 days when stored at 16.5° C., and only an average of 1.7 and 3 days when stored at 19.2° C. It is also seen that feeding females live longer than non-feeding females. Adult females stored at 16.5° C. and fed on honey and water lived an average of 10 days while non-feeding females stored at 16.3° C. lived only an average of 6 days.

The sex ratio

By counting the number of males and females in a population of the parasite of 972 individuals, the sex ratio was found 2:1. This is the sex ratio one normally gets from the progeny of one cocoon mass and even from the progeny of the eggs laid at one insertion.

Few cocoon masses, however, collected in the field gave only males, while one cocoon mass of 17 parasite pupae also collected in the field gave only females.

The species is arrhenotokous, i.e. unfertilised females produce, parthenogenitically, male offspring only.

Stage of the host attacked by the parasite

All early larval instars of the host, *Agrotis ypsilon*, are readily attacked by the parasite. The latter would even sting and deposit the normal number of eggs in host larvae less than 24 hours old. The first and second larval instars of the host, however, are killed one to two days after parasitisation probably through the effect of the sting. The sixth instar host larvae, on the other hand, has not been observed to be attacked, while the fifth instar larva is rarely attacked. The third and fourth instars (4-12 days old at 26° C.), however, seem to be the most suitable larval instars for successful parasitisation.

An experiment carried out in the laboratory at 26° C. showed that the oldest *Agrotis* larva parasitised by *Apanteles* was an advanced fifth instar larva, 16 days old.

Effect of parasitism on host larvae

The parasite lays its eggs just under the skin of the host. After hatching the parasite larvae feed on the host body fluids and fat body; they wander but very little in the host body. Since the vital organs of the host are not attacked, the latter exhibits but few external indications of being parasitised. Gradually, however, the host becomes sluggish and looses its appetite until two days before the parasites leave its body, when it stops feeding and moulting. The host keeps living, however, for an average of twenty-four hours and a maximum of three days after the parasites come out of its body. During this period it does not take any food. It is important to note that all parasitised host larvae fail to pupate.

Number of parasites per host larva

Material collected in the field shows that there is no correlation between the host species and the number of parasites that come out from a single host larva. Collections of *Agrotis* larvae in the field showed that the average number of *Apanteles* larvae to come out from a single host was 63 with a maximum of 124 and a minimum of 22. The maximum number of parasite larvae to come out from single host larva as obtained from breedings in the laboratory was 96.

Seasonal history

Agrotis ypsilon, the main host of *Apanteles ruficrus* in Egypt, has two important peaks of abundance, the first in November and December and the second in March and April. The season of great abundance of the parasite coincides with the spring peak of abundance of the host.

The adult parasites of the winter generation emerge in March with the March outbreak of the pest. The peak of abundance of *Apanteles* cocoons in nature occurs a little later in late April and May. At this period the parasite attacks *Agrotis*, *Laphygma* and *Plusia*. In summer the parasite attacks mainly *Laphygma* especially on cotton and corn and *Sesamia* on corn. By October *Sesamia* population begins to decrease while the *Agrotis* population begins to build up and the parasite begins to attack the latter host. Thus the sequence of hosts of the parasite in the field is mainly as follows : *Agrotis* from October to March followed by *Agrotis*, *Laphygma* and *Plusia*, then *Laphygma* and *Sesamia* in summer and finally *Agrotis* again from October to March.

BIOLOGICAL FACTORS AFFECTING APANTELES POPULATION

The different stages of the parasite are subjected to various biological factors which may have some bearing on the population of the parasite.

It has been shown that few females may be dislodged while ovipositing and wounded to death by the mandibles of the host larvae.

Cannibalism, which is a common phenomenon in *Agrotis*, may also play a role in the destruction of large numbers of the parasite. Unparasitised host larvae do not only feed on parasitised individuals thus destroying the eggs and larvae of the parasite contained in these individuals, but also may feed on larvae and pupae of the parasite after they have left their host. Predators of various kinds which attack *Agrotis* larvae may feed on parasitised host larvae and thus destroy a large number of the eggs and larvae of the parasite. Birds, ants and other predators were noticed to consume large numbers of full grown larvae and pupae of the parasite.

Hyperparasites

A Pteromalid was observed to emerge from cocoons of *Apanteles* collected in the field. On completing its development, the hyperparasite makes an exit hole through the side walls of *Apanteles* cocoons. This hole is easily distinguished from the exit hole of *Apanteles* previously described. Under field conditions the percentage of hyperparasitism by this Pteromalid is very low.

ROLE OF APANTELES IN CONTROLLING AGROTIS IN EGYPT

Willcocks (1937) states that *Apanteles* is a common parasite on *Agrotis ypsilon* and that possibly it is this species which keeps *Agrotis pronuba* and *A. spinifera* in check. Bishara (1932) claims that *Apanteles ruficrus* is probably the most important parasite of *Agrotis ypsilon* in Egypt and estimated the percentage of field parasitism at 1% in winter, 15-16% in March, and 27-34 % in April at Giza.

The writer collected large numbers of *Agrotis ypsilon* larvae from different localities of Egypt at different months in order to estimate the percentage of parasitism by *Apanteles*. Table VI shows the percentage of parasitism in nine different months.

TABLE VI

Percentage of parasitism of Agrotis ypsilon *by* Apanteles ruficrus.

DATE	PERCENTAGE OF PARASITISM	DATE	PERCENTAGE OF PARASITISM
January	2	July	0
February	2.5	August...........	0
March	10	October	5
April	25	December	4
May	15		

This Table also shows that parasitism by *Apanteles* is an important factor in controlling *Agrotis ypsilon* especially on clover in March, April and May. During this period, the percentage of parasitism rises up to 25 %. In some samples, however, the percentage of parasitism was as high as 50 %. In winter months the activity of the parasite is limited and the percentage of parasitism is low. During this period, parasitism by *Gonia capitata* De Geer (Diptera-Tachinidae) exceeds that of *Apanteles*. In spring and early summer, however, the percentage of parasitism by *Apanteles* exceeds that of *Gonia*.

SUMMARY

Apanteles ruficrus Hal. is a gregarious internal larval parasite of many Noctuids. It is widely distributed in Egypt. It is an important parasite of *Agrotis ypsilon*, especially in spring and early summer. It ranks second to *Gonia capitata* as the most important parasite of this pest.

The parasite has three larval instars, the last leaves its host body to spin the cocoon. Parasites from one host larva spin their cocoons in form of a pearly white mass near the host. The average number of parasites that come out from a single host larva is 63. The duration of the various stages is as follows : incubation period, 4-9 days ; larval peroid, 5-34 days ; and pupal period, 3-18 days.

Mating takes place a short time after emergence and oviposition takes place soon thereafter. The average number of eggs laid per insertion of the ovipositor is 26, the number of eggs laid per female is 215 and the number of host larvae parasitised by a single female is 5. Longevity of adults varies from 1-51 days. Females live a little longer than males. The species is arrhenotokous and sex ratio is 2:1. The most suitable instars of *Agrotis ypsilon* for successful parasitism are the third and fourth larval. The different developmental stages of the parasite are subjected to various biological factors which may have some bearing on its population.

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Studies on the Mediterranean Fruit-fly *Ceratitis capitata* Wied.

[**Diptera-Trypaneidae**]

E.M.N.

II. BIOLOGY AND CONTROL (1)

(with 52 Text-Figures [Figs. 1-3, 14, and 23 are coloured], and 2 Graphs)

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CONTENTS

Introduction. — Economic importance. — Symptoms of infestation. — Seasonal prevalence of the fly. — Feeding habits. — The alimentary canal. — Influence of food. — The malpighian tubes. — The significance of the calcium carbonate formation. — The food of the flies in the field. — The senses by which the fly finds its food and its host. — The influence of light on the flies. — Copulation. — Egg-laying. — The Egg. — The larva. — The internal anatomy of the larva. — The pupal stage. — The emergence of the adult. — The longevity of the adult. — Control measures. — Cost of treatment. — Acknowledgments. — Summary. — References.

INTRODUCTION

The name, Mediterranean fruit-fly was given to this insect by Froggatt who thought it was introduced from the Mediterranean region.

The attack of this insect on different kinds of fruits has been known as far as 100 years ago, and since then, it has established itself all over the world. Strong quarantine regulations kept it out of North America. Its history and distribution has been given in an excellent account by Back and Pemberton 1918.

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(1) Part I (*The structure and operation of the reproductive organs*) has been published in this Bulletin, Vol. XXII, 1938 (1939).

Bull. Soc. Fouad Ier Entom., XXXI, 1947. [251].

ECONOMIC IMPORTANCE

The Mediterranean fruit-fly (*Ceratitis capitata* Wied.) is considered to be a recent pest in Egypt, as it has not been recorded until 1904 by Compère, and that F. Fletcher did not mention it in his « Notes on Egyptian Insect Pests » published in Cairo in 1910. Its damage, especially to Citrus fruits, varies considerably from year to year according to climatic and different other factors that will be dealt with in a separate paper.

A list of the Egyptian host fruits has been mentioned by El-Ghawabi in the Agricultural Journal of Egypt, 1924-1925. We can here mention that the peach and apricot cultivated area in Egypt has been enormously decreasing the last 30 years owing to the attack of this insect. The infestation is usually so severe that we can hardly find a ripe fruit escaping its attack. Guava is also infested but not so severely. The attack on plums is slight. Most citrus fruits, especially those grown in Lower Egypt, are attacked. The Egyptian lime and the common acid lemon are the only two citrus fruits exempted from its attack. The average percentage of infestation during the whole season (from August till February) in the last five years 1940-1945 in the Barrage, Benha, and Shebin El-Kom, differs according to the variety of Citrus fruits and was as follows :

Egyptian lime 0 %, acid lemon 0 %, grape fruit 1.5 %, sweet Egyptian lime 0.5 %, bitter oranges 0 %, common Egyptian oranges 3 %, Java oranges 2.5 %, navel oranges 2.5 %, sugar oranges 0.5 %, common Egyptian tangerines 5 %.

In summer oranges, the attack starts to appear in April and gradually increases till the end of the season in August. The average attack being 18 %. The mean infestation of the common Egyptian oranges left on the trees till May is about 20 %.

SYMPTOMS OF INFESTATION

The Mediterranean fruit-fly does not start to oviposit its eggs in the fruits until they reach a certain degree of maturity. Every kind of fruit responds to infestation different to the other. In green oranges and mandarines, the fruit may turn slightly pale round the puncture. This area becomes more and more yellowish until it occupies a big, more or less circular portion of the rind's surface and it is easy at this stage to detect infested fruits (fig. 1).

In grape-fruit and sweet Egyptian lime (fig. 2), the attack could be detected by the appearance of a fine drop of clear gum on top of the puncture. In peaches, the gum usually appears as fine long filaments extending from the puncture especially if the fruits are not ripe (fig. 3). Peaches attacked when ripe, do not exhibit any conspicuous superficial signs of in-

Studies on the Mediterranean Fruit-Fly, II

A. D. HANNA

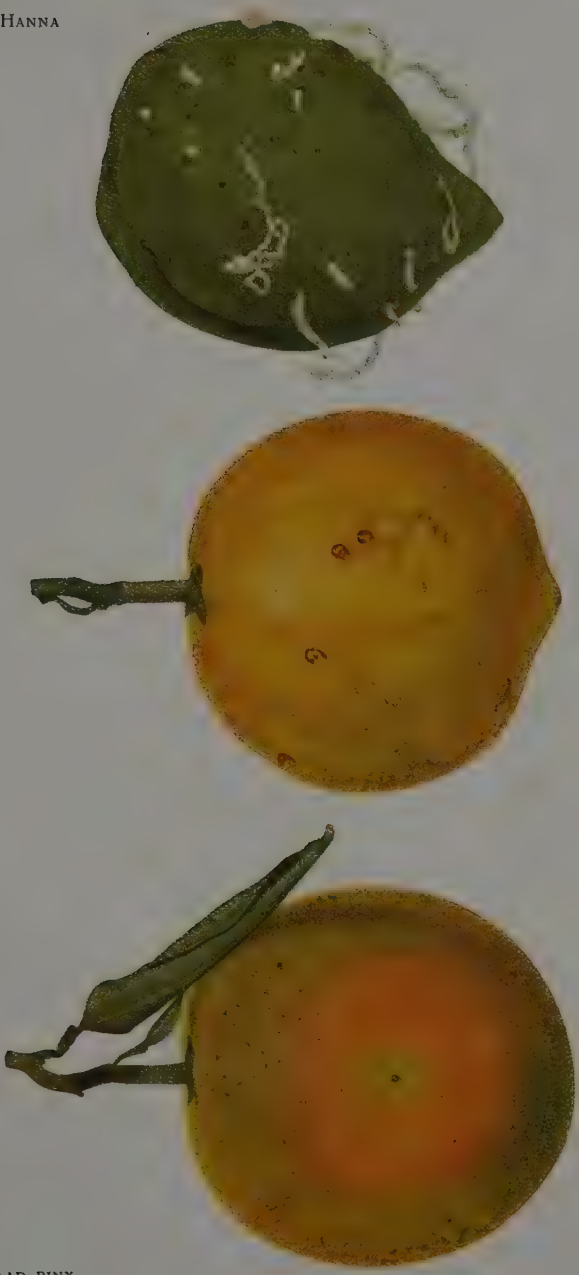


Fig. 1 : Symptoms of attack in oranges. — Fig. 2 : Symptoms of attack in sweet lime. — Fig. 3 : Symptoms of attack in peaches.

B. ASSAAD PINX.

Bull. Soc. Fouad Ier Entom., XXXI, 1947.

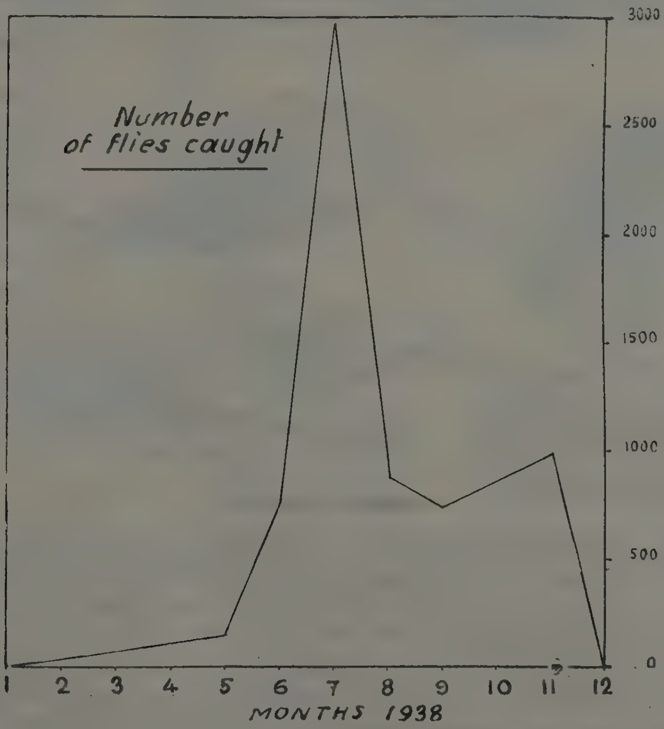
festation. A slight pressure on the fruit, however, will cause a liquid to ooze out from the puncture.

When mangoes are infested, a sticky liquid comes out from the puncture.

In later stages of infestation, when the larvae grow, a subsidised soft area appears round the puncture which gives in, on pressing by the fingers.

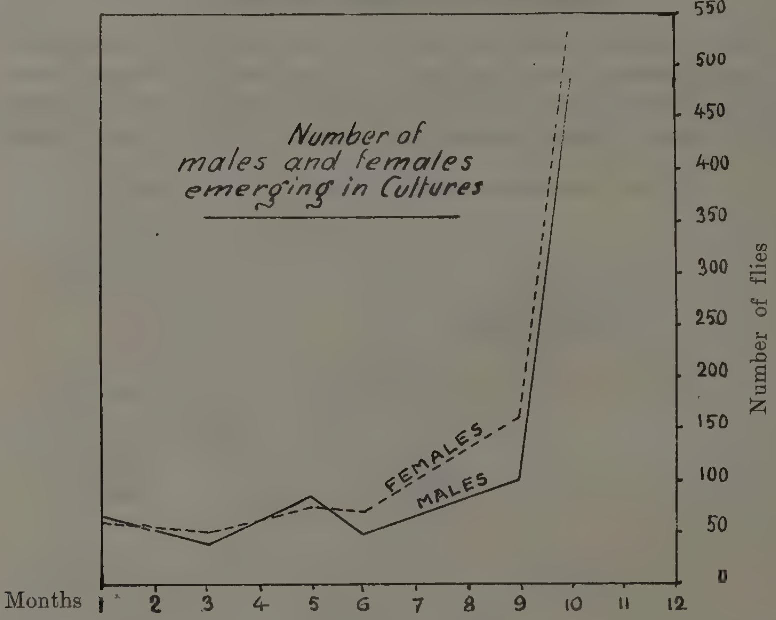
SEASONAL PREVALENCE OF THE FLY

The comparative abundance of the fly throughout the year depends on climatic conditions as well as the kind of fruit used as a breeding media. In an experiment carried out in the Barrage in a mixed orchard containing apricots, peaches, guavas, mangoes, and almost all kinds of citrus, 50 glass traps filled with 5 % Clensel (a patent manufactured by John Paterson and Co., Glasgow) as an attractant were suspended and distributed on all the trees and they were examined, and the Clensel changed once every six days. The result is shown in Graph I from which we could deduce that



the flies are most abundant during July when peaches reach maturity. Then the number suddenly drops in August and rises again in October when the citrus fruits reach maturity.

The number of females caught was more than that of the males (ratio 3 : 2), but this does not coincide with the results obtained from rearing the insect in cultures in the laboratory as the ratio between the two sexes are almost equal as shown in Graph II.



FEEDING HABITS

For a thorough comprehension of the feeding habits of the fly, it is essential to describe the anatomy of the mouth parts and the alimentary canal.

The *proboscis* comprises :

(a) The *rostrum*, which is the basal region and consists of the fulcrum which is a boat-shaped sclerite with a membranous roof (fig. 5, MEM). Its two lateral sides are produced upwards and backwards where they join to form the clypeus (fig. 6, CLY).

(b) The *haustellum* : The anterior side of the fulcrum is attached to the channel or tubular mouth (fig. 4, TBR) formed by the labium-epipharynx and the labium hypopharynx, by means of a short cylindrical membrane strengthened by chitinous narrow U-shaped ribbons arranged one behind the other and serve to keep it open, and also act as a hinge in folding the proboscis during retraction. This channel ends anteriorly in a vesicle, the prestomum (fig. 4, PRS). On each side of the channel there is a chitinous rod originating from its anterior end and is directed downwards and backwards and serve for the attachment of muscles (fig. 7, CTR).

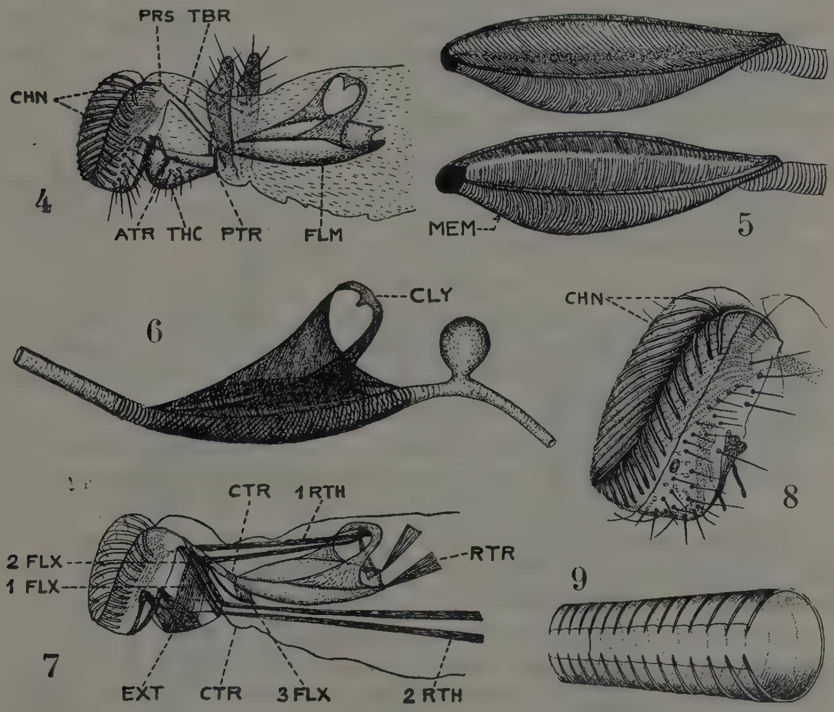


Fig. 4 : The mouth-part of the fly (ATR, anterior rod; CHN, food channels; FLM, fulcrum; PRS, prestomum; PTR, posterior rod; TBR, tubular mouth; THC, theca). — Fig. 5 : The boat-shaped sclerite of the fulcrum (MEM, membrane). — Fig. 6 : The fulcrum (CLY, clypeus). — Fig. 7 : The muscles of the mouth-parts (CTR, chitinous rod; EXT, extensors of the oral lobes; FLX (1, 2 and 3), flexors of the haustellum; RTH (1 and 2), the retractors of the haustellum; RTR, the retractors of the rostrum). — Fig. 8 : The labellum (CHN, food channels). — Fig. 9 : A food channel.

On the ventral side of the tubular mouth, there is a boat-shaped chitinous plate, the theca (fig. 4, THC) which has two pairs of chitinous rods, one stretches from each side of its anterior upper ends and articulates with the skeleton of the oral lobes and the other originates from the posterior ends of the theca and is inserted on each side of the tubular mouth (fig. 4, ATR and PTR).

(c) The *labella :* Each consists of two membranous lobes which are, when distended, more or less oval in shape. Each lobe is separate from the other by a vertical space. The membrane investing the distal surface of the labella contains a series of food channels (figs. 4 and 8, CHN) which are kept open by a series of incomplete chitinous rings arranged one above the other (fig. 9). They open on the external surface of the oral lobes by means of spaces lying between the two extremities of the two arms of the rings. The width of these spaces is 2.5 to 3 μ. All the tubes communicate to the prestomum which is situated between the upper surface of the two lobes.

When the proboscis is protruded, the rostrum is probably extended by means of the distension of the lateral air sacs at its base. The haustellum is brought into use by means of the contraction of its extensor muscles and finally the oral lobes are extended by blood pressure.

The chief muscles of the proboscis are :

(a) The *dilators of the pharynx :* They originate on the roof of the pharynx and become inserted on the clypeus (fig. 6). The retraction of these muscles causes the withdrawal of the roof from the floor of the pharynx producing a vacuum, thereby the suction of the liquid food takes place.

(b) The *retractors of the haustellum :* A pair of muscles arises on the skeleton of the head capsule and is inserted into the posterior corners of the theca, one on each side (fig. 7, 2 RTH). Another pair originates on the clypeus of the fulcrum and is attached to the tubular mouth, about half way down its length (fig. 7, 1 RTH). The contraction of these muscles causes the retraction of the haustellum.

(c) The *flexors of the haustellum :* One muscle stretches between the anterior region of the tubular mouth and the theca (fig. 7, 1 FLX), the other stretches between the posterior corners of the theca and the anterior end of the tubular mouth (fig. 7, 2 FLX), one on each side. There is yet a third pair originating on the posterior end of the rod attached to the tubular mouth and is directed backwards to be inserted on the anterior ventral side of the fulcrum (fig. 7, 3 FLX). These muscles serve to extend the haustellum during the extension of the proboscis.

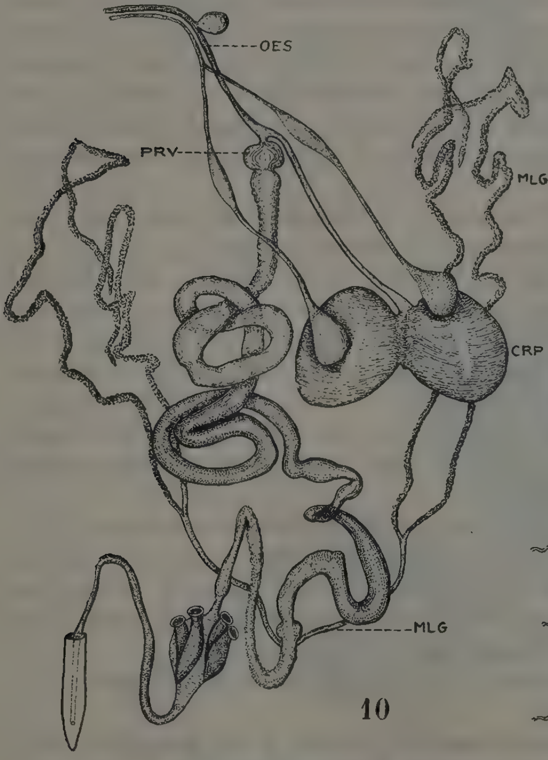
(d) The *retractors of the rostrum :* A pair of muscles originates on the posterior corners of the fulcrum, one on each side, and is inserted to the genae (fig. 7, RTR). Its contraction pulls the fulcrum towards the head.

(e) The *extensors of the oral lobes :* There is a pair of muscles stretching betwen the floor of the theca and the upper edges of the labial skeleton one on each side (fig. 7, EXT). Its contraction protrudes the oral lobes.

THE ALIMENTARY CANAL

The *pharynx* has already been described.

The *oesophagus* is a narrow tube commencing at the proximal end of the pharynx. It has an oval outgrowth on its dorsal side (fig. 10, OES) shortly after it leaves the pharynx. The function of this outgrowth is not known, but it seems that it acts as a valve to prevent the liquid food contained in the posterior part of the alimentary canal to pass forward in the wrong direction during the suction of the food through the siphon formed by the mouth parts. The oesophagus then passes from the cervical part to the thorax where it opens into the spherical proventriculus (fig. 10, PRV).



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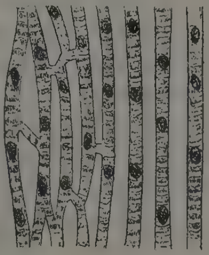

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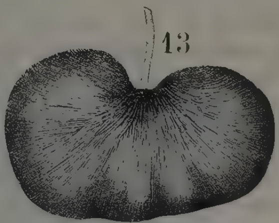

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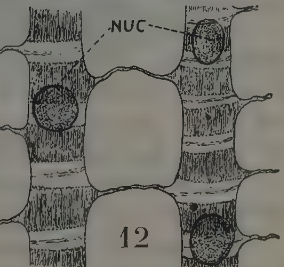

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Fig. 10 : The digestive system of the fly (CRP, crop; MLG, malpighian tubes; OES, oesophagus; PRV, proventriculus). — Fig. 11 : The muscles of the crop. — Fig. 12 : The muscles of the crop highly magnified (NUC, nuclei). — Fig. 13 : The crop and its muscles.

The *crop* is a large bilobed sac occupying a considerable part of the anterior section of the abdomen. It is connected to the oesophagus by means of a narrow long tube which makes its origin opposite the entrance of the proventriculus (fig. 10, CRP). The capacity of the crop for holding a large amount of liquid is considerable. This was worked out by keeping 100 flies directly after they emerge from the pupae in glass jars and feeding them for 2 days on a cane sugar solution. Then they were transferred into other clean jars where they were kept for 4 days without food until they were nearly starving, the dorsal and the ventral sides of the abdomen could be seen almost touching each other. Every fly was then weighed by August Sauter Electric Balance. The average weight of each starving fly was found to be 5 milligrams. After feeding the mean weight of a single fly becomes 8.6 milligrams. The capacity of the crop in holding liquid food is therefore 3.6 milligrams. It is worthy of note, that the process of feeding is very quick and usually takes about one minute or so. When the flies were dissected, after feeding, the crop was found to be distended and almost losing its bilobed shape.

Now, does this liquid food pass to the intestine and then what is not needed by the fly for its urgent use is diverted to the crop, or does it go directly to the crop and pass on gradually to the intestine when the food is needed ? This point was cleared by feeding some starving flies on a solution of cane sugar coloured with indigo carmine. The flies were dissected directly after they stop feeding and in every case, the crop was found to be full of coloured solution and there was no trace of the colour in the intestine (fig. 14). After about seven minutes, the anterior part of the intestine starts to be coloured and finally after about three hours the coloured frass appears.

The walls of the crop is covered with narrow fibres of muscles (fig. 13) anastomosing in all directions (fig. 11). Each fibre consists of a series of alternate light and dark striae arranged at right angles to its long axis and closed in a structureless sheath, the sarcolemma, underneath which there are a number of oval nuclei (fig. 12, NUC).

The *mid gut* is devisable into an anterior wide region followed by a narrower proximal intestine.

The *hind intestine* starts behind the junction of the Malpighian tubes. It runs posteriorly and curves forward and then backward to run into a more dilated part forming the rectal cavity containing the four rectal glands. The posterior part of the rectal cavity thins out to form a narrow tube which ends into the anus. In the male this tube is very short but in the female it is very long and runs through the ovipositor to end at its tip.

INFLUENCE OF FOOD

The loss inflicted by the fruit-fly on our fruits is indirectly connected by the feeding habits of the fly as the output of the eggs produced by the

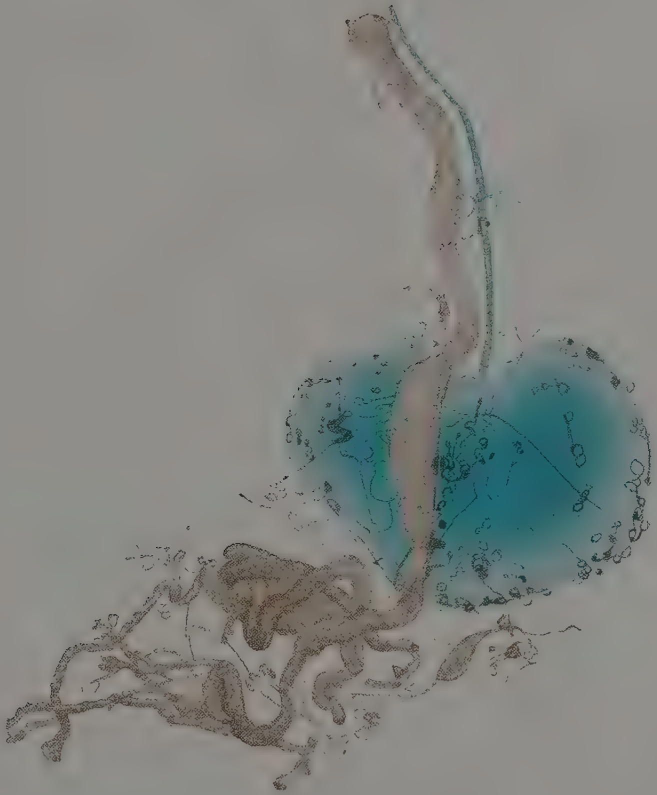

Fig. 14 : The digestive system of the fly, showing the coloured crop.

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female depends on the chemical constitution of the food taken. It would be natural therefore to arrive at the conclusion that possessing a fair knowledge of the problem of nutrition is of enormous practical importance in the successful control of the insect. Uvarov examined all the literature on insect nutrition as a whole and came to the ultimate result that the bulk of papers on the feeding habits or the digestion of insects were not physiological but purely descriptive, anatomical or histological. In view of this fact, it was thought desirable to pay more attention to the nutritional requirements of the insect.

The Influence of Food on the Fertility of the Adult

I. The Female

On working the life history of the fly, it was necessary to rear them in the laboratory. Fifty couples of flies, each couple kept in a square glass jar three litres in capacity, were fed on a piece of cotton wool soaked in cane sugar solution. One apple was placed in every jar for oviposition. The average number of eggs laid by each female was 16, the maximum being 43. The pre-oviposition period was 8.5 days and the average longevity of the fly was 11.5 days. The females, when dead, were dissected and found to be exhausted as they hardly contain neither fat bodies nor mature eggs (fig. 15). It could be gathered from this, that the females did not lay their normal output of eggs and their oviposition period was nearly doubled. After a long trial we were brought up to the fact that the eggs contain a large proportion of protein which could only be derived from the food taken by the fly. If on the other hand the food is devoid of protein, the main constituent that goes into the formation of eggs will be lacking.

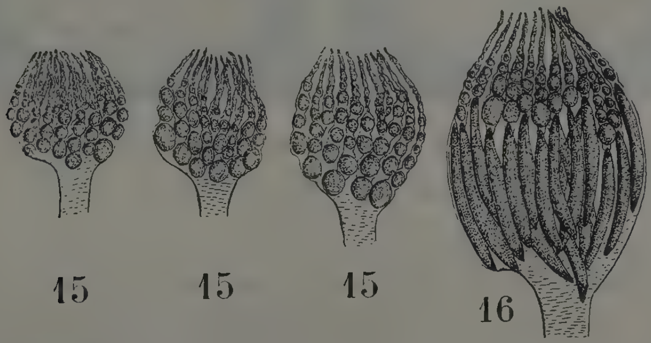


Fig. 15 : Ovaries of flies 90 days old, fed on a cane sugar solution. — Fig. 16 : Ovary of a female 7 days old, fed on a sugar cane solution and protein.

Now, if a small amount of protein is added to the cane sugar solution, the behaviour is suddenly altered (fig. 16). The females start to deposit their eggs after 4 days of their emergence. They live on the average 32 days and the number of eggs laid by each was about 280.

We could gather from the foregoing account that the female fly could not be expected to live, in the field, on the nectar of flowers containing only carbohydrates and no protein which is indispensable, in our case, for the production of eggs. In other insects however, as in the butterflies, the adult seems to produce its normal number of eggs at the expense of the protein reserved by the larvae and carried over to the adult during metamorphosis especially if the larvae are living on a food rich in protein. In the fruits used as a host for this insect, there is a comparative deficiency of protein (about 0.8 %) which seems to be partly covered by the larvae ingesting some of the yeast plant living on the sugar contents of the fruits.

If, however, the females are fed exclusively on a water solution of egg protein, they will only live about seven days after which they die without laying any eggs.

II. The Male

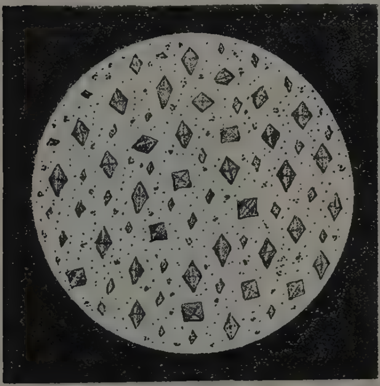
The male, contrary to the female, is not influenced by feeding on a pure solution of either sugar or protein. It becomes sexually mature after four days (in June) whether fed on a solution of sugar, or protein, or a combination of both ; but it will only live seven days if fed on protein alone.

THE MALPIGHIAN TUBES

The *Malpighian tubes* are four in number, arising in pairs from a common duct on either side of the proximal intestine (fig. 10, MLG).

It was noticed, when dissecting some flies reared on a cane sugar solution, that the Malpighian tubes contain occasionally some amorphous white granules. If the cane sugar solution on which the fly feeds was left a long time so as to be fermented, the amount of granules becomes considerable and, on the other hand, when the solution is prepared fresh every day, they contain either very little granules or not at all. This observation lends reasons for believing that these granules were formed as a result of the fly feeding on a fermented solution of sugar containing acetic acid and that the few granules present in the Malpighian tubes of the flies fed on a fresh solution of cane sugar was also produced by the fermentation of sugar inside the crop of the fly which could hold liquid food to sustain the fly for four days. Further and detailed analyses of this phenomenon yields important information. Flies were kept in glass jars and fed on a solution of cane sugar to which a little quantity of one of the following vegetable acids was added : lactic, citric, malic, tartaric, oxalic, and acetic. After six days the flies were dissected and in all cases the Malpighian tubes were found to contain granules occupying a considerable part of their length. If however, these acids are replaced by mineral acids, e.g. hydrochloric, nitric or sulphuric, no granules appeared in the Malpighian tubes.

Now, what is the chemical constitution of these granules ? When Hcl is added to the Malpighian tubes, there is an effervescence of gas bubbles. By putting a few Malpighian tubes in a glass ring stuck to a slide by means of wax, then a few drops of Hcl is added to them and the ring is immediately covered by a cover slip with a suspended drop of lime water and left for a while; this drop is seen under the binocular to become gradually turbid. The base is therefore a carbonate.



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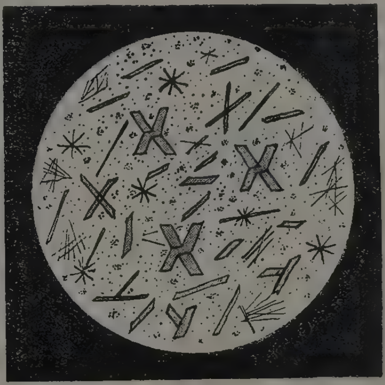

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Fig. 17 : Calcium oxalate crystals. — Fig. 18 : Calcium sulphate crystals.

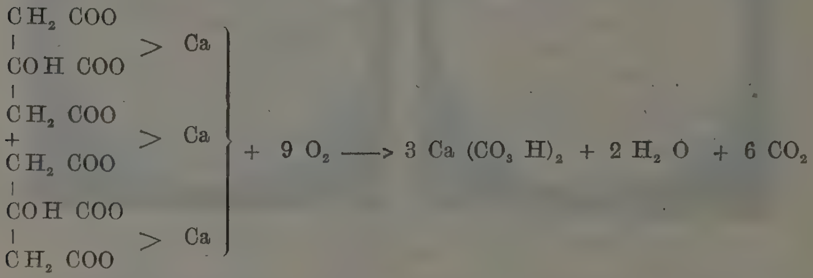
On the other hand if the Malpighian tubes are placed on a slide and then a few drops of Hcl are added and finally a drop of ammonium oxalate solution and left for a while, a colourless, transparent octahedral crystals, envelope shaped, of calcium oxalate are formed (fig. 17). These are insoluble in acetic acid and soluble in hydrochloric acid. Again if the Malpighian tubes are treated with H_2SO_4 aggregated needle shaped crystals of calcium sulphate make their appearance (fig. 18). These granules are therefore calcium carbonate. They were also detected in the lumen of the Malpighian tubes of some Diptera, especially *Drosophila*, *Calliphora*, and some other insects. Nothing is known about the mechanism of their formation.

THE SIGNIFICANCE OF THE CALCIUM CARBONATE FORMATION

The reaction of the blood under normal conditions is always kept constant. It is only in the terminal stages of life that any alteration might take place. The constancy of the hydrogen ion concentration is a necessary condition for the continuance of the life of the living cells. It is therefore essential for the preservation of life that the acids thus accumulated in the process of feeding, should be neutralised.

Now, when the fly feeds on a vegetable acid which eventually passes on to the blood, this tends to alter the hydrogen ion concentration of the blood. The reaction of the blood is soon corrected by a regulating mechanism, This is mostly carried out by chemical substances contained in the blood, which are generally known « buffer substances ». In the case of the fruit-fly, this buffer appears to be calcium mono-phosphate $Ca\,H_4\,(PO_4)_2$ which is fairly soluble in water.

If the adult or the larval food contains citric acid, it is soon absorbed by the blood where the reaction taking place seems to be as follows :



$$\left.\begin{array}{ll} CH_2\,COO & \\ | & > Ca \\ COH\,COO & \\ | & \\ CH_2\,COO & \\ + & > Ca \\ CH_2\,COO & \\ | & \\ COH\,COO & \\ | & > Ca \\ CH_2\,COO & \end{array}\right\} + 9\,O_2 \longrightarrow 3\,Ca\,(CO_3\,H)_2 + 2\,H_2\,O + 6\,CO_2$$

Calcium bicarbonate is soluble in water and it seems that when it is taken up by the Malpighian tubes from the blood, CO_2 and HO_2 are set free with the precipitation of the insoluble calcium carbonate inside the Malpighian tubes.

THE FOOD OF THE FLIES IN THE FIELD

It is commonly accepted that the flies feed on the nectar of flowers, but we have previously shown that it could not possibly meet the nutritional requirements of the insect especially the females where protein is essential for the production of eggs. Sugar is also required for the formation of eggs as has already been mentioned. Furthermore, it was noticed that the Malpighian tubes of the flies caught from the field contain a considerable amount of calcium carbonate granules. This lends reason for believing that the flies must feed on a vegetable acid that might be accessible to them in the field. The only source of this vegetable acid appears to be in the fallen fruits which contain besides organic acids, sugar as well as protein. It is noteworthy to mention here that this has a very important bearing upon the methods of control that will be discussed later.

THE SENSES BY WHICH THE FLY FINDS ITS FOOD AND ITS HOST

The Eyes

The fly has a pair of big faceted eyes consisting of a multitude of crowded eyelets. They are from the pseudocone type (fig. 19). As deduced from the structure of the eyes, the fly is incapable of seeing actual images. The image synthasized in the brain is a mosaic of dots of light of different luminosity and as the facets are numerous, it might be gathered that the image formed is fairly a clear one.

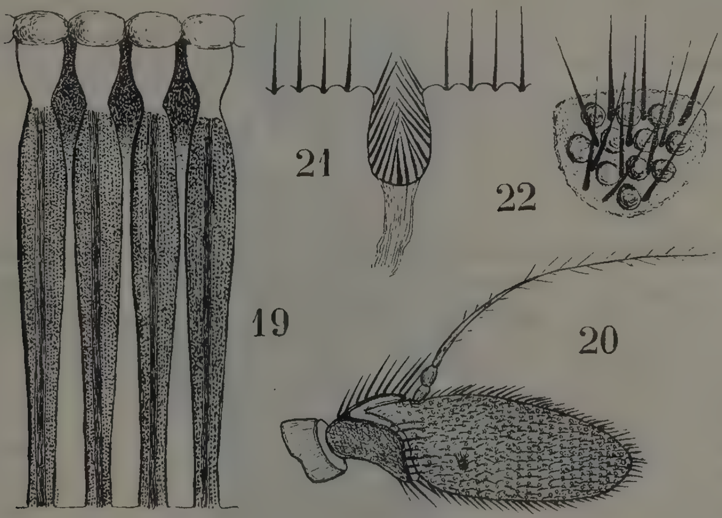


Fig. 19 : A section through the eye of the fly. — Fig. 20 : The antenna of the fly. — Fig. 21 : The sensory depression of the antenna. — Fig. 22 : Pore plates.

The Olfactory Organs

The olfactory organs are located in the antennae. They are of two types :

(a) The olfactory pits situated one on each posterior outer side of the antenna (fig. 20). They are depressions, the sides of which are covered with sensory rods (fig. 21). Each sensory rod is enervated with a fine nerve which all meet to form the olfactory nerve.

(b) The pore plates are circular membranes distributed all over the antenna in enormous numbers (Fig. 22). They are depressed a little below the surface of the antenna. Between the pore plates there are a considerable number of thin walled sensory hairs.

It seems probable that the fly is directed to its food and to its host by means of its visual as well as its olfactory organs.

THE INFLUENCE OF LIGHT ON THE FLIES

If some of the flies are put in a glass jar lying near the window, they will all collect at the end of the jar nearest the light. If the jar is turned round, they will crawl to the other end again towards the light. Most surprising of all, if a piece of cotton wool soaked in cane sugar solution is placed at the other end of the jar, the end farthest from the light, they make no attempt to reach the meal, the light rays hold them captive at the end nearest the window. If the jar is taken to the open at noon time in June and half of it is covered with a black piece of cloth, they tend to accumulate at first to the exposed end of the jar, but after a while the response is reversed and they make for the dark half of the jar. This accounts for the flies seeking shady places in the summer when it is hot and sunny places in the winter.

TABLE I

MONTH	AVERAGE NUMBER OF DAYS	MAXIMUM NUMBER OF DAYS	MINIMUM NUMBER OF DAYS	AVERAGE TEMPERATURE IN °C.
January	15	18	10	11
February	14	18	10	13
March	9	12	6	16
April	5.5	7	5	21
May	5	6	5	23
June............ .	4	6	3	26
July	4	5	3	27
August............	4	5	3	27
September	5.5	7	3	24
October	7	10	4	22
November	8.5	11	7	18
December	14	18	9	13

COPULATION

According to our observations in the laboratory, copulation usually takes place between 9 a.m. and 1 p.m. The male pursues the female from one

A. D. HANNA

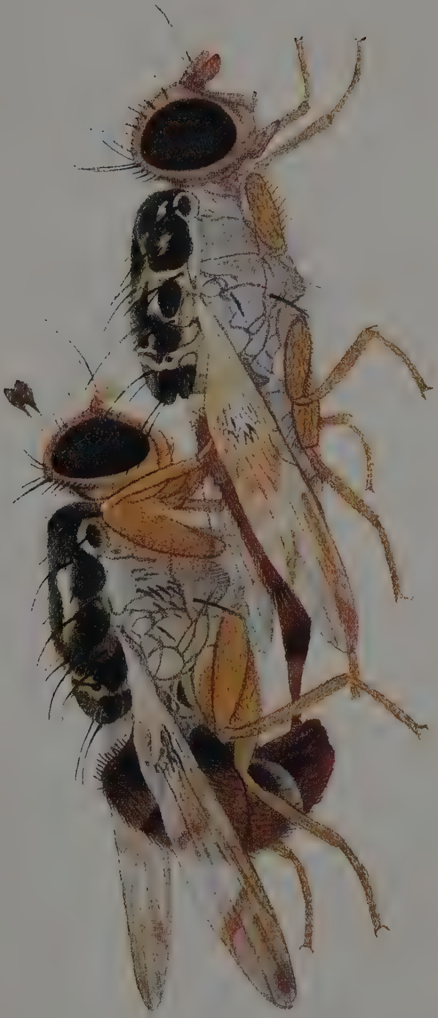


Fig. 23 : The Mediterranean Fruit-fly (*Ceratitis capitata* Wied.) in copulation.

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place to another, sometimes for a long time. When the female accepts the male, she stops and produces a part of its ovipositor a little backwards. Sometimes the male helps the female in protruding her ovipositor by holding its tip by his forelegs and pulling it out. Then he climbs on top of her holding her, by his forelegs, from the anterior part of the abdomen and soon the penis is uncoiled and introduced into the opening of the genital duct. This process lasts quite a long time. Its duration on the average is two hours and ten minutes (maximum three hours, minimum 1 hour) (fig. 23). After copulation the female retracts her ovipositor and sometimes she places the tip of the ovipositor against the surface on which she stands and by a retreating movement it is pushed back to its normal position. Copulation takes place repeatedly.

The time taken by the flies to reach sexual maturity depends on the time of the year. In the laboratory in Giza it is given in Table I.

EGG-LAYING

When the fly attempts to deposit its eggs, it first wanders about over the surface of the fruit as if trying to choose a suitable place for oviposition, then the ovipositor is seen to extend gradually to its full length and then it is bent downwards until it makes almost a right angle to the surface of the fruit. The pointed end of the ovipositor is then pushed gradually through the rind by moving it up and down until the desired depth is attained which is usually about 2.5 mms. then the ovipositor is seen to be drawn up and pushed in again repeatedly in different directions, so as to form the chamber in which the eggs are to be laid. This chamber is always in the white part of the rind in Citrus fruits. In stone fruits the eggs are laid in the pulp.

Oviposition takes on the average twenty minutes. When the laying of the eggs is over, the fly withdraws its ovipositor and cleans it by passing its hind legs over it several times.

The puncture is elliptical in shape and hardly visible by the naked eye (fig. 24). The opening has a flap formed by the broken epicarp of the fruit and it usually makes with the surface of the fruit an angle of about 45°.

The average number of eggs laid in each chamber is 22, as many as 78 eggs has been found in one chamber in tangerines. The average number of eggs laid by 130 couples fed on sugar-cane solution and protein was 280 eggs each, the maximum being 568 eggs.

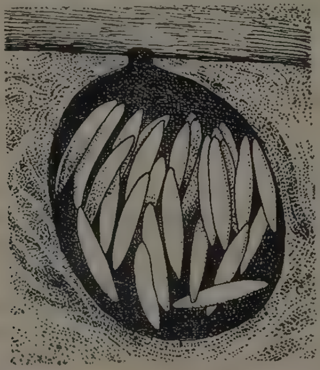
The Position of the Puncture

It has been noticed that the flies do not lay their eggs indiscriminately in any par of the citrus fruits. The puncture is usually produced in the navel or the middle side of the fruits, although it might be in rare cases near the stem end.

All kinds of citrus fruits were examined in orchards in different parts of the country to determine the position of the punctures. Altogether 1131 fruits were examined, 31 fruits only, had punctures near the stem end, 566 in the middle and 421 near the navel end.

It is remarkable why the flies should choose such position while the gravity is working against them. The task of oviposition would have been much easier had they made their puncture near the stem end. The reasons accounting for this will be dealt with in another paper.

In stone fruits, on the other hand, the flies lay their eggs in any part, the majority being laid near the stem end.



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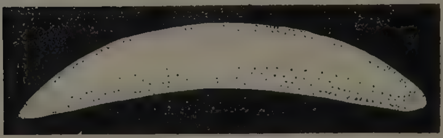

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Fig. 24 : An egg chamber of *Ceratitis capitata* Wied. — Fig. 25 : The egg.

THE EGG

Eggs are white and elliptical in outline, but slightly bent in the middle. They are about 950 μ in length and 120 μ in width (fig. 25). The incubation period differs according to the season, as shown in Table II.

TABLE II

The Average Duration of the Fruit-fly Stages at different Months of the year

MONTH	EGG STAGE IN DAYS	LARVAL STAGE IN DAYS	PUPAL STAGE IN DAYS	AVERAGE TEMPERATURE IN °C.
March	6	30	30	16
April	3	15	12	20
May	2.5	12	11	23
June.............	2	9	8	26
July	2	9	8	27
Angust...........	2	9	8	27
September	2.5	10	9	24
October	3	13	12	22
November	4.5	25	20	18
December	—	—	—	13
January	—	—	—	11
February	—	—	—	13

THE LARVA

The larva is usually white in colour, but it might have a slight tint of red or pink according to the colour of the food it injest that shows through the transparent integuments. It is elongate and conical in outline with the pointed end in front. It has 12 apparent segments. Three distinct stages could be recognised.

The First Stage larva

The larva measures about one millimetre in length and 150 μ in width. It could be distinguished from the other two instars by :

(1) The absence of the anterior spiracle. Each of the two posterior spiracles, on the terminal segment, has two curved elliptical openings (fig. 26). The two main tracheal trunks start from the posterior spiracles and extend anteriorly to the front segment where they join.

(2) The cephalopharyngeal skeleton, consisting of the mandibular sclerite with three teeth, the hypostomal sclerite which is long and slender, and finally the cephalopharyngeal sclerite. All the three parts constituting it are fused together (fig. 27). The duration of this instar is about two days in the summer.

The Second Stage larva

The larva measures about three millimetres in length and 900 μ in width. It is recognised by :

(1) The appearance of the anterior spiracles on the second segment. They are fan-shaped and each consisting of 8-10 lobes (fig. 28). Each of the posterior spiracles has three slits. The slit is usually divided, by a chitinized process, into two. In addition there are other processes that project slightly from one edge of the slit but they do not join the other opposite side (fig. 29). There are four batches of hairs on the exterior side of each spiracle.

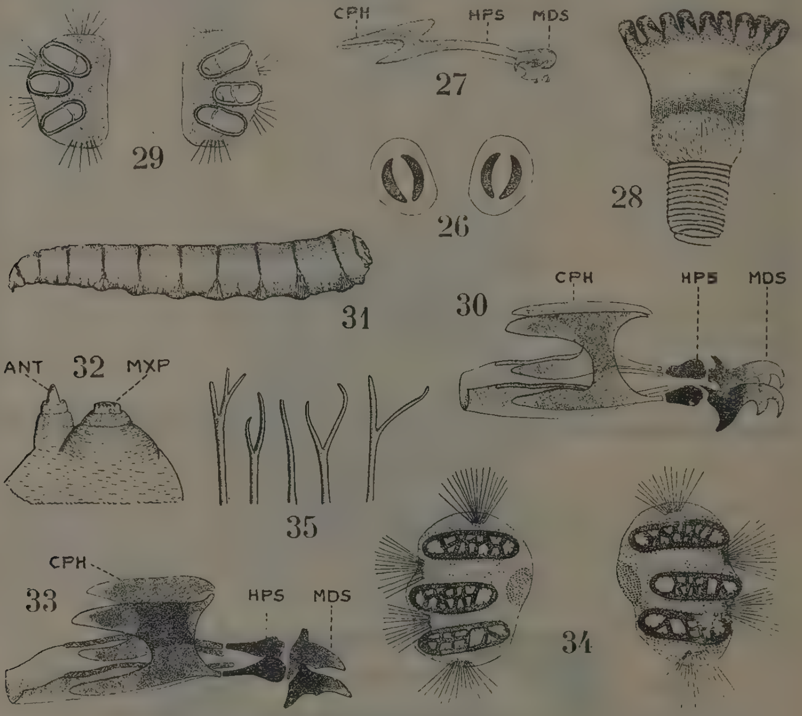


Fig. 26 : The posterior spiracles of the first stage larva. — Fig. 27 : The cephalopharyngeal skeleton of the first stage larva (CPH, cephalopharyngeal sclerite; HPS, hypostomal sclerite; MDS, mandibular sclerite). — Fig. 28 : The anterior spiracle of the larva. — Fig. 29 : The posterior spiracles of the second stage larva. — Fig. 30 : The cephalopharyngeal skeleton of the second stage larva. — Fig. 31 : The full-grown larva. — Fig. 32 : ANT, antenna; MXP, maxillary palps. — Fig. 33 : Cephalopharyngeal skeleton of the third stage larva. — Fig. 34 : The posterior spiracles of the third stage larva. — Fig. 35 : Hairs.

(2) The cephalopharyngeal skeleton consists of three separate pieces : The mandibular sclerite with two curved sharp teeth, the heavily chitinized and pear-shaped hypostomal sclerite and lastly the cephalopharyngeal sclerite with its ventral and dorsal broad elongations (fig. 30).

The duration of this stage is about one day in the summer.

The Third Stage larva

The larva measures about 7.5 mms, in length and 1.8 mm. in width (fig. 31). The antenna has two joints, the apical one being conical in shape, and the basal one short and broad (fig. 32, ANT). The maxillary palps are dome-like and carry at the top three sensoria (fig. 32, MXP).

The cephalo-pharyngeal skeleton is similar to that of the second instar (fig. 33), but there is some slight differences thus :

(a) The teeth of the mandibular sclerite are not so prominent.

(b) The hypostomal sclerite is slightly longer.

(c) The cephalopharyngeal sclerite is more chitinized.

Each of the posterior spiracles has three slits which are in turn divided by heavily chitinized processes into many compartments (fig. 34). The spiracle has as in the second stage four batches of hairs, some of them being branched and the others are not (fig. 35).

If the larva is removed at this stage from its host, it exhibits a peculiar habit of jumping. The larva curves its body into a circle, the jaws cling to the posterior segment of the abdomen and then by a sudden muscular relaxation, they spring a few inches into the air.

The duration of this stage is about six days in the summer.

THE INTERNAL ANATOMY OF THE LARVA

The Digestive System

The alimentary canal of the larva is very long and assumes a convoluted course. It is divided into three regions (fig. 36) :

(a) The Fore-intestine

The pharynx is well developed (fig. 36, PHR) and is located at the base ot the pharyngeal sclerite. It is provided with an elaborate muscular system to make it function as a pumping organ.

The oesophagus is a straight narrow tube (fig. 36, OES) stretching from the pharynx to the proventriculus which is pear-shaped in outline (fig. 36, PRV).

(b) The Mid-intestine

It is a very long much convoluted tube with different calibre (fig. 36, MDS). It is wide towards its junction with the proventiculus, then it thins out along its course and finally widens up again.

At the commencement of the mid-intestine, there are four gastric cœca. They are short rather long convoluted tubes (fig. 36, GST).

(c) The Hind-intestine

The hind-intestine starts from the region where the Malpighian tubes are inserted (fig. 36, HDS). It is a long twisted and convoluted tube whose calibre is not uniform throughout its course.

The Salivary Glands

There is a pair of large tubular salivary glands lying on both sides of the anterior region of the alimentary canal (fig. 36, SLV). Each gland is produced anteriorly into a very fine duct proceeding towards the pharynx to meet its fellow on the other side forming a common median duct which runs forward underneath the pharynx.

The Malpighian Tubes

There are two assymetrical pairs of Malpighian tubes, one on each side arising at the junction of the mid and hind intestine. They are very long and rather big in diameter. Near their origin, the two tubes of each side unite to form a common wider tube (fig. 36, MPG). At the distal end however, one pair of one side only becomes abruptly dilated to form two wide and long tubular sacs (fig. 36, TUB) which fill up most of the abdominal cavity. Their lumen is occupied by white opaque granules identical with those found in the Malpighian tubes of the adult, i.e. calcium carbonate. The significance of its formation has already been discussed.

The Nervous System

The nervous system consists of a boat-shaped nerve mass lying in the fifth and sixth segments and representing the union of eleven pairs of ganglia. It is covered by a sheath and it is not until this is dissected out that the limits of the component ganglia could be demarcated by short vertical depressions on both sides (fig. 37). The nerve mass carries on the dorsal anterior side a pair of large spherical ganglia, the cerebral lobes (figs. 37 and 38, CRB). There is a nerve originating from a depression on the dorsal side of each lobe. They are united in the middle just above the opening of the oesophageal passage. According to Hewitt, the cerebral lobes are the future supra-oesophageal ganglia and the optic lobe of the fly.

There are eleven pairs of long nerves arising on each side of the nerve mass (fig. 37) innervating different parts of the body. The two front nerves differ from the others, as they are spindle-shaped near the base and are attached to the main nerve mass by a short stalk. Their free ends are drawn into very long nerves.

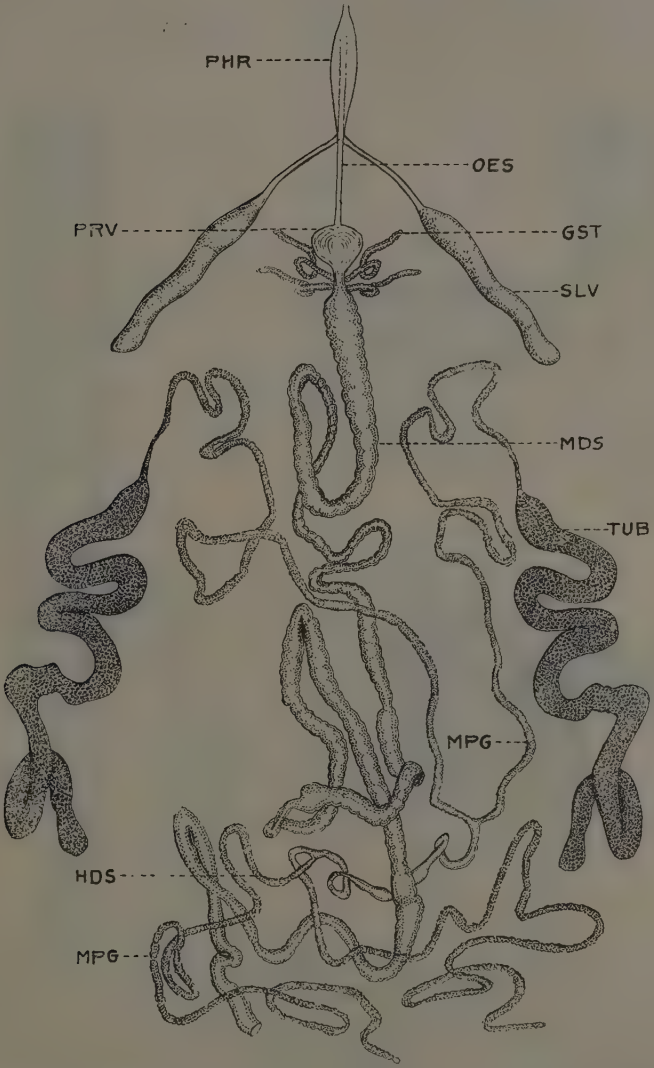
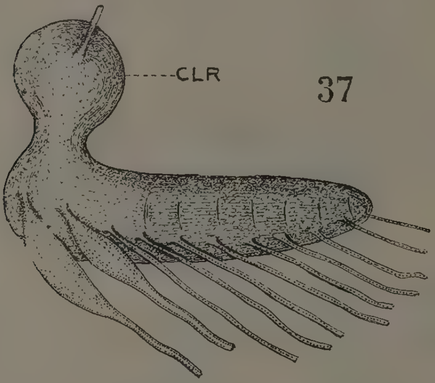


Fig. 36 : The digestive system of the larva (GST, gastric coeca; HDS, hind intestine; MDS, mid intestine; MPG, malpighian tube; OES, œsophagus; PHR, pharynx; PRV, proventriculus; TUB, tubular sac of the malpighian tube; SLV, salivary gland).

The Vascular System

The dorsal vessel comprises :

(a) The heart lies in the four posterior segments of the abdomen and consists of three distinct chambers separated from each other by ostia. The basal chamber is round and is the smallest one in the heart. The chambers become gradually bigger towards the front (fig. 39).



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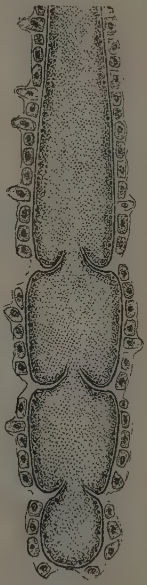

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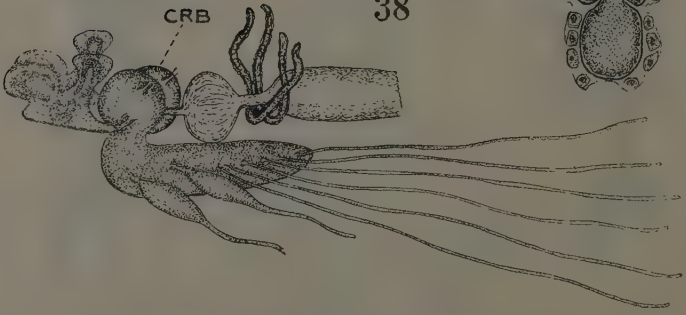

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Fig. 37 : The nervous system of the larva (CRL, cerebral lobe). — Fig. 38 : The nervous system of the larva (CRB, cerebral lobe). — Fig. 39 : The circulatory system of the larva.

(b) The aorta is the anterior extension of the heart. It narrows towards its anterior extremity until it enters the head.

The Respiratory System

The respiratory system of the full grown larva consists of two longitudinal trunks on both sides united anteriorly and posteriorly by transverse commissures. Each lateral trunk is connected to the exterior by the posterior and anterior spiracles.

It is noticed that the larva could live under the water for quite a long time. This is made possible, it seems, by the four batches of hairs surrounding the two posterior spiracles which are set inclined towards the inside and hold the water at a distance, so that when the larva is submerged in the water, it will carry with it a big bubble of air which is used for respiration. If a larva is held gently between two fingers with its posterior extremity directed downwards and passed over a flame of a small spirit lamp so as to burn the hairs round the posterior spiracles, it will die in a few minutes if it is then submerged in water.

The Full-Grown larva

After reaching full maturity, the larvae crawls out of the fruit and falls on the soil and penetrates into it for a depth of about three centimetres, where it pupates. It may also pupate in one of the crevices in the soil.

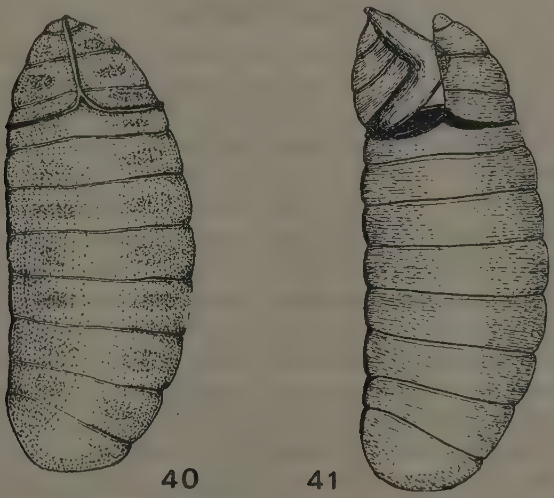


Fig. 40 : The pupa of *Ceratitis capilata* Wied. — Fig. 41 : The same open.

THE PUPAL STAGE

The pupa is elliptical and slightly convex on the dorsal side. It is dark brown in colour and measures about 4.3 mms. in length and 2.3 mms.

in width. It consists of twelve segments (fig. 40). The duration of the pupal stage during different seasons of the year is mentioned in Table I.

THE EMERGENCE OF THE ADULT

There are three lines of weakness in the puparium, one goes round the circumference of the posterior edge of the fourth segment, the other two proceed from the anterior tip, one is directed mid-dorsally and the other mid-ventrally until they meet the first line (fig. 40). The fly when ready to emerge, thrusts off the anterior part of the puparium along the lines of weakness mentioned above (fig. 41). This is accomplished by the exersion of the inflated ptilinum in front of the head. It then crawls out of the puparium and forces its way through the surface of the soil. Its colour is at first light brown and the wings are slung to the abdomen, but they soon become darker in colour and the wings freed from the abdomen.

THE LONGEVITY OF THE ADULT

The average longevity of 130 couples reared under laboratory conditions is 32 days, eleven flies lived for 96 days. They were all fed on a sugar-cane solution to which a little egg-protein was added.

CONTROL MEASURES

Because the eggs, the larvae and the pupae of the Mediterranean Fruit-fly are hidden beyond our reach either inside the fruits or the soil, the adult stage is therefore the most appropriate stage at which the insect is to be controlled, especially as we have a long pre-oviposition period in which we can deal with the fly before it starts to inflict its damage.

The first one to attempt the control of the Mediterranean Fruit-fly by the use of a poison spray was Mally in South Africa, 1904. His formula consists of : 1 lb. lead arsenate, 5 gallons of treacle, and 25 gallons of water.

Since then, several attempts have been made to introduce some improvement either by changing in the concentration of the ingredients of the foregoing formula or by replacing the toxic substance by another one, e.g. calcium arsenate, copper carbonate and sodium fluosilicate, etc.

It was not until 1924 that Newman in Western Australia used pollard in the bait for the first time, employing 4 lbs. pollard, 4 oz. treacle, 5 oz. arsenate of lead, and 8 oz. borax (to prevent fermentation), made up to 4 gallons with water, soaked it several hours and allowed it to settle, using only clear liquid as a bait which was placed in special tins.

On the other hand, various oils and patents (Clensel) have been tried in different parts of the world by placing them in traps or containers to attract or repel the flies, but unfortunately, in spite of all these trials, we are very far as yet from being able to recommend any definite control for this insect and furthermore, if we look closely at these trials, we can easily gather that there is no scientific background behind them.

Here then, it may well to fall back on the feeding habits and the nutritional requirements of the fly and lay them down as a base for our control measures, thus :

The mouth parts of the fruit-fly are adapted for licking and sucking food in solution. We have mentioned before that the width of the spaces opening to the exterior in the pseudotrachea is 2,5 to 3 μ. Therefore, the flies can hardly take solid particles of food. This was demonstrated by feeding the flies on a cane sugar solution to which a very fine powder of the insoluble red iron oxide was added. After the flies were fed, they were dissected and the red particles of the iron oxide were seen to be collected in a line on the outer side of the pseudotracheal openings. The particles could not gain entrance as there was no trace of them in the crop.

The fly on the other hand, is capable of liquefying dry soluble substances like sugar, by regurgitating liquid food from the crop. This phenomenon was illustrated by feeding some flies on a sugar solution to which some indigo carmine was added. Then a piece of blotting paper was soaked in a sugar solution and dried up in an oven and placed with the flies in a jar. The flies in trying to feed on the sugar in the blotting paper will soon regurgitate blue drops of liquid which is soon absorbed by the blotting paper leaving a blue mark on it.

Further, we have illustrated before that the fly rarely lays eggs unless its food contains both sugar and protein. It is also worth while to point out again that the flies caught in the field has their Malpighian tubes dense with calcium carbonate granules.

There can be no doubt therefore, that the food of the insect in its natural habitat must contain : (1) sugar, (2) protein, and (3) organic acid.

It is indeed perfectly possible to suggest that there is nothing in the field to contain these 3 substances except fallen fruits.

In all these foregoing facts lies the key for the control of the fly, for, if we collect the fallen fruits from a mixed citrus orchard and analyse them to find out the percentage of sugar, protein and organic acids in the juice, it will furnish us with the main chemical composition of the food of the fly in its natural habitat.

If on the other hand we could compose a similar food from substances available to us and add to it an appropriate toxic material, it might work as a bait for the fly.

The analysis of the juice of the fallen fruits in December when they are mature was as follows :

Sugar 5.7 %, protein 0.5 %, organic acids 10 %, and water 83.8 %.

After a long trial, we were able to constitute a solution as near as possible to the foregoing one by adding :

10 litres of mollases (containing 55 % sugar, and its density being 1.36), 500 grams casein, and 100 litres of water,

or by adding :

10 litres of mollases, 4 kilograms of fine wheat bran, and 100 litres of water.

They were left about twelve hours in the summer and sixteen hours in the winter to allow it to ferment. After that it was analysed and, found to contain :

in summer :

6.2 % sugar, 0.4 % protein, 12.0 % organic acids, and 81.4 % water,

or in winter :

5.6 % sugar, 0.37 % protein, 15.8 % organic acids, and 78.23 % water.

In choosing the toxic substance it was necessary to test systematically the toxicity of all available soluble or fairly soluble salts : *sodium* nitrate, nitrite, synite, carbonate, bicarbonate, thiosulphate, salicilate, sulphate, arsenite, arsenate, fluoride, fluosilicate, potassium tartarate, phosphate, borate ; *potassium* iodide, nitrate, alum, bromate, bromide, carbonate, chlorate, chloride, chromate, fluoride, permanganate, fluosilicate, sulphate ; *ammonium* chloride, polysulphide, sulphate, bicarbonate, bromide, carbonate, cyanide, iodide, arsenate, nitrate, permanganate, phosphate, thiocyanate ; *calcium* chloride, bicarbonate, borate, chlorate ; *copper* chloride, carbonate, oxychloride, arsenite, bromide, fluoride, nitrate, sulphate, cuprous iodide, cuprous chloride ; *magnesium* chloride, nitride ; *zinc* chloride, sulphate, arsenite, carbonate, chromate, cyanide, nitrate ; *thallium* sulphate ; *iron:* ferric chloride, ferric sulphate, ferrous sulphate ; *mercury :* mercuric iodide, mercure chloride, mercuric ammonium chloride, mercuric potassium chloride ; *barium* chloride. All were used in different concentrations. This was done by keeping some flies four days without food in order to get the crop empty and then placing every hundred flies in a square glass jar three litres in capacity with a 10 % sugar solution to which was added one of the substances whose toxicity is to be tested in one of the following concentrations : 0.25, 0.50, 1, 2 and 3 % respectively and recording the number of flies that die every six hours.

The toxicity of the following salts was found to be the most lethal, their toxicity being almost equal :

(1) barium chloride, (2) antimony and potassium tartarate, (3) sodium nitrite, (4) sodium fluoride, (5) sodium arsenate, and (6) sodium arsenite.

The minimum concentration that kills the fly within 24 hours is 2 %. The capacity of the crop, as has already been mentioned, is about 3.6 milligrams, which would contain about 0.072 milligrams of one of the foregoing toxic substances (concentration 2 %).

In the case of sodium fluosilicate, which is slightly soluble in water (0.65 %), it will take a longer time to kill the fly. The amount of liquid the crop could hold is capable of dissolving 0.023 milligram of sodium fluosilicate only, which when administered by the fly will not poison it within 24 hours. It has to feed therefore two to three days in order that the accumulative effect of the sodium fluosilicate will exhibit itself.

This fact is demonstrated by painting two small glass plates, one with a paste made of one gram sodium fluosilicate, one gram of sugar, two c.c. of water, and the other made of sodium fluoride or barium chloride together with the other ingredients in the same foregoing proportions. After drying them up in an oven, each was introduced in a glass jar with 200 flies together with a piece of cotton wool soaked in water to provide for a drink. A small percentage, 18 % of the flies, in the first jar died within 24 hours, while in the other jar 83 % of the flies died. For this reason we had to use highly soluble toxic salts in controlling the fly and, in addition, they should be used in such a concentrated form that when the fly takes a meal of it, the poison taken will not become greatly diluted if the crop originally contained liquid food.

Now, if we add one of these salts in the same concentration as will kill the flies within, 24 hours, e.g. 2 %, to the solution previously devised, it might form a good bait for the flies. On the other hand, evidence gathered from many of our experiments shows that if this bait is sprayed on the trees, it will badly injure the leaves. It has to be used therefore without allowing it to come in contact with them. This is only possible if we use a container to carry the bait.

There now remains for consideration the question of the bait carrier. On the outset, we must here mention that it should possess the following qualities : (a) to hold a lot of the liquid, and (b) to retain it for a long time.

The carriers tried were :

(1) Copper containers (fig. 42) were suspended one on each peach tree at Dokki and refilled every five days. They proved to be unsatisfactory because the bait dries up within a few hours. The percentage of attack in peaches treated by this method was 100 %.

(2) Glass traps (fig. 43) caught a large number of female flies but the reduction in the population was not enough to make any difference between the treated and the untreated peaches.

(3) Earthenware pots or « kulla » in Arabic (fig. 44) were filled with the bait and hanged on peach trees, one for each tree. The liquid filtering out of the pores attracted the flies. The use of this container brought down the infestation of peaches to 20 % against 100 % in the control (in Dokki).

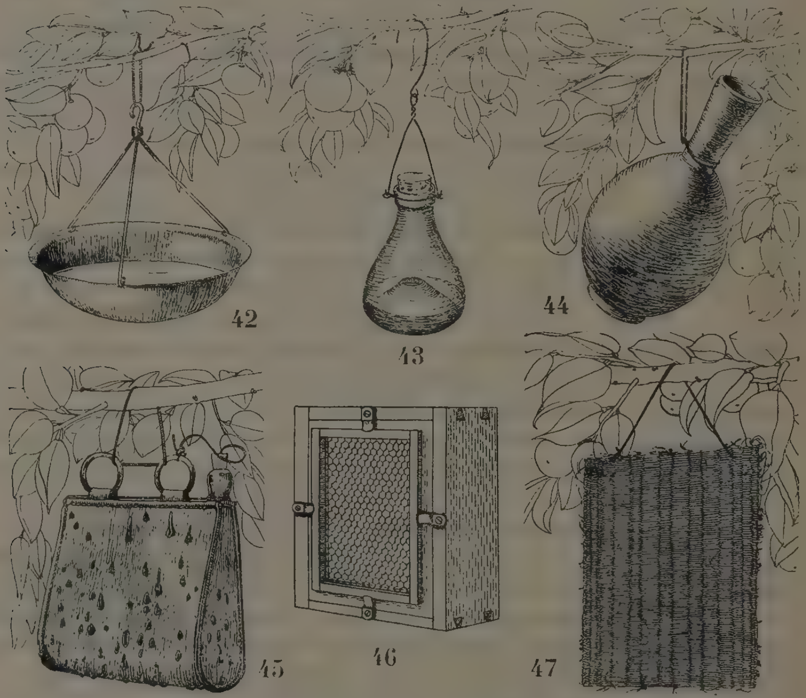


Fig. 42 : A copper container. — Fig. 43 : A glass trap. — Fig. 44 : An earthenware pot. — Fig. 45 : A canvas water-carrier. — Fig. 46 : A box for sea weeds. — Fig. 47 : A mat made of *Typha angustata.*

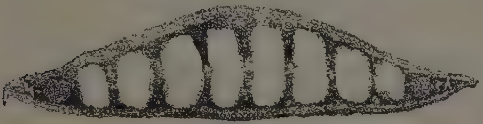
Its drawback is that the pores become, after a time, blocked and does not allow the liquid to filter and it had to be rubbed by a brush every few days.

(4) Canvas water-carriers (fig. 45) did not answer our purpose as their cloth rotted after a time by a fungus that lived on their surface.

(5) Sea weeds, *Posidonia oceanica*. It is known that the sea-weeds absorb the atmospheric moisture and it was thought that if they were placed in a box made chiefly of wide wire gauze (fig. 46) and dipped in the bait, it will keep moist for a long time, but when they were transported from the sea side to Cairo, they lost their property of absorbing moisture.

(6) Mats measuring 70 cms by 40 cms (fig. 47), made of *Typha angustata* B.-C. (Typhaceae), a fresh-water weed, could not fit in with our purpose as they dried very quickly.

(7) Bundles of maize stalks (dry), *Zea mays* L., measuring about 35 cms. in length and 15 cms. in diameter. Their capacity for absorbing the bait is very weak. This is due to the minute size of the air spaces which could be clearly illustrated by cutting a transverse section through a dry stalk (fig. 48).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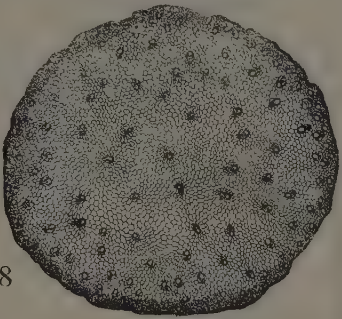
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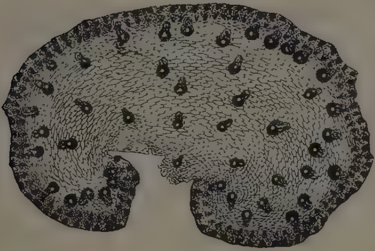
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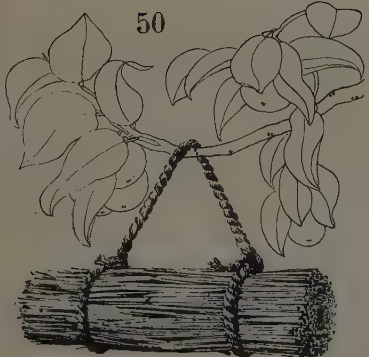
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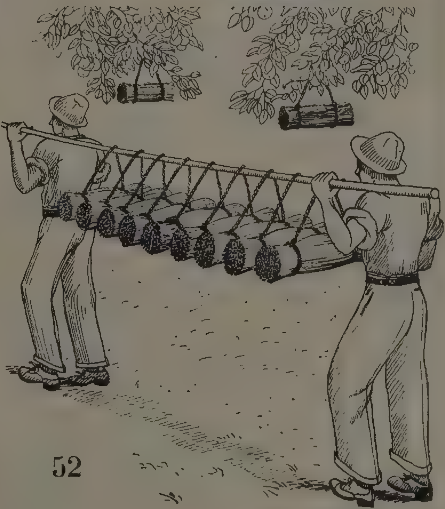
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Fig. 48 : A cross-section through a dry stalk of dry maize. — Fig. 49 : A section through the leaf of *Juncus maritimus*. — Fig. 50 : A bundle of *Typha angustata*. — Fig. 51 : A cross-section through a leaf of *Typha angustata*, showing the large air spaces. — Fig. 52 : Carrying the bundles.

(8) Bundles of *Juncus maritimus* var. *arabicus* A.-B. (Juncaceae), a

xerophytic plant growing on the sides of banks. They are made of the same size as those of the maize stalks. The amount of bait they absorb is slightly higher than the foregoing bundles, the air spaces being wider as shown in Figure 49.

(9) Bundles (fig. 50) of *Typha angustata* B.-C. (Typhaceae) of the same size as the foregoing bundles. This plant is a water weed growing in marshes all over the country. The bundles absorb a considerable quantity of the bait (0.6 litre) and retain a big amount of it for four to five days in the hottest months of the year. A cross-section in the leaf will clearly show its large air spaces which absorb and hold the bait (fig. 51). These bundles therefore, exhibit obvious indications in favour of its use.

Table III

YEAR	LOCALITY	KIND OF FRUIT	NUMBER OF TREES	PERCENTAGE OF SOUND FRUITS	PERCENTAGE OF SOUND FRUIT IN THE CONTROL
1940	Barrage	Peaches	130	96.9	0
»	»	Citrus fruits	1600	99.8	95
1941	El-Maamoura (Alexandria)	Peaches	1000	99.7	0
»	El-Saffein (Mit Ghamr)	»	300	99.5	70
»	Faculty Agriculture (Giza)	»	300	94.7	1
1942	Barrage	»	130	88	0
»	»	Apricots	78	99	60
»	El-Maamoura (Alexandria)	Peaches	1000	99	30
1943	Faculty Agriculture (Giza)	»	300	68	0
»	» » »	Apricots	40	96	37
1945	Ashmoun	Peaches	900	98	2

The bundles are carried as shown in Figure 52.

Now, we have to take up the question of its application in the field.

Peaches are the most infested fruits by the Mediterranean Fruit-fly in this country. The attack is almost always 100 %. Accordingly, the peaches are selected to test the efficiency of these bundles in controlling the fly.

These bundles were first tried in the Barrage on 130 peach trees. They were dipped in the bait once every six days and hanged by a wire hook on the trees, half way up in the shade.

Our experiments show that the biggest population of the fly is in the middle of the tree. This was shown by hanging fly glass traps filled with Clensel at different heights of the trees, the largest catches were always from the middle of the trees.

Furthermore, we have mentioned before that the fly is positive to light, but on the other hand, if the temperature becomes high, the response is reversed and they become negative to light. This behaviour suggests that the bundles should be hanged in the shade under the trees in the summer (in peaches) and in the sun between the trees in the winter (in citrus).

Table III gives a brief summary of the results of experiments carried out during the last period 1940 to 1945.

The experiment carried out at the Faculty of Agriculture, Giza, 1943, was not successful as the molasses used, although contained the usual percentage of sugar (55 %), yet its taste was very bitter.

It is obvious that the plots for control could not be taken either in the same orchard of experiment or adjacent to it, where the bundles are bound to reduce the population. These plots are chosen half to one kilometer from the treated trees.

It must be mentioned here that Isaakidis in Greece, 1936, was apparently the first one to use bundles of branches dipped in a poisonous sugary solution and suspended on the trees for controlling the Mediterranean Fruit-fly. Hollage in Italy, and other workers used them for combating the olive flies.

COST OF TREATMENT

The cost of 100 litres of our bait is as follows :

10 litres of molasses at 120 millims, 4 kilograms of bran at 16 millims, and 2 kilograms of sodium arsenite at 50 millims, total 186 millims

If sodium arsenate is used, the bait will cost 202 millims, or 236 millims with barium chloride, or again 276 millims with sodium fluoride, and finally 586 millims with antimony and potassium tartarate.

The last one is too expensive, so it had to be discarded.

Accordingly 100 trees, each with a bundle holding 0.6 litre, will cost in one dipping :

112 millims with sodium arsenite, 121 millims with sodium arsenate, 142 millims with barium chloride, and 165 millims with sodium fluoride.

The cost of each bundle is about 2 millims. It could be used for a period of at least five years. This will make the yearly cost of 100 bundles fourty millims.

We could gather from the above account that the cost of treating 100 trees of the following fruits for a season will be.

In Peaches

The bundles are hanged from the middle of May till the middle of July, e.g. 60 days. The bundles are dipped every 6 days, making altogether

10 dippings. One boy earning 20 millims a day could dip and hang 100 bundles daily.

The final cost will therefore be of 136 piastres with sodium arsenite, 145 with sodium arsenate, 166 with barium chloride, and 189 with sodium fluoride.

In Apricots

The fruits are treated from the middle of April to the end of May. They need 5 dippings, 6 days in between. One hundred trees will cost : 70 piastres with sodium arsenite, 74.5 with sodium arsenate, 85 with barium chloride, and 96.5 with sodium fluoride.

In Guava

The period of treatment is from the middle of July till the middle of September. The interval between each dipping and cost is the same as in peaches.

In Citrus Fruits

They are treated from the first of October till the first of December. Owing to the comparatively low temperature during the period of treatment, the interval between each dipping is prolonged, e.g. 15 days. Only four dippings are needed. One hundred trees will thus cost : 56.8 piastres with sodium arsenite, 60.4 with sodium arsenate, 68.8 with barium chloride, and 78 with sodium fluoride.

The prices mentioned above are pre-war prices, as we had a stock that carried us over the war. The present prices are not yet established and consequently they are not dependable.

Attention must here be called, that in using sodium arsenite or sodium arsenate, the bundles must be left edge on for a while to allow the excess of the liquid to drip off, away from the trees. If the liquid drops on the leaves, it will scorch them, and on the other hand, if it falls on the soil, it will dissolve in the water of irrigation causing the death of the trees.

It will be better therefore to use sodium fluoride or barium chloride if they are obtainable, as they have the advantage of being harmless to the leaves and trees.

ACKNOWLEDGMENTS

I wish to express my thanks and gratitude to Prof. Dr. H. Priesner and Mohamed Soleiman El-Zoheiry Bey, the previous and the present Directors of the Entomological Section, Ministry of Agriculture, for their help and advice. My sincere thanks to Amin Ezzat

Effendi, Fouad Faris Effendi, and Kamil Gamal El-Din Effendi, my assistants, and also to Farid Abd-El-Fattah Effendi and A. El-Badry Effendi, my laboratory assisstants, for their unfailing help.

SUMMARY

(1) The percentage of attack differs in different Citrus fruits.
(2) The life-history and habits of the fly were worked out.
(3) The egg, the larval and the pupal stages are described and the anatomy of the larva and also the digestive system of the adult were mentioned with special stress on the malpighian tubes and the significance of the calcium carbonate granules present inside them.
(4) The effect of the separate and the combined effect of the sugar and protein in the food of the fly on the fertility of the male and female flies.
(5) Control methods based on facts gathered from the life-history and habits of the fly.
(6) The cost of control measures was calculated.

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The distribution and vegetation of egg-laying sites of the Desert Locust *(Schistocerca gregaria* Forsk.) in Tripolitania in 1946

(with 3 Tables, 2 Text-Figures, and 4 Plates)

by E. S. Brown, B.A., F.R.E.S.

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1. Introduction. — 2. Physiographical features of the Country. — 3. An account of the egg-laying sites. — 4. Distribution of egg-laying sites. — 5. Observations on plants eaten by hoppers. — 6. Effect of hopper distribution on Control Methods. — 7. Summary. — 8. Acknowledgments.

1. INTRODUCTION

During a visit to Tripolitania, made on behalf of the Middle East Anti-Locust Unit, at the end of March and in April, 1946, for the purpose of assisting with the anti-locust campaign, a number of observations were made on the vegetation and other features of the egg-laying sites of the Desert Locust (*Schistocerca gregaria* Forsk.).

Schistocerca gregaria is only a temporary visitor to Tripolitania, which it invades in periods of plague. The breeding sites described here have therefore no bearing necessarily on its permanent habits, but merely throw light on the nature of the sites most often selected for oviposition in this particluar country by the swarming phase.

The winter of 1945-46 was the third successive year of the present swarming cycle, in which Tripolitania had been invaded. The Desert Locust had previously visited Tripolitania during the plague years 1928-32, but before that it had not occurred for over twenty years (di Cairano, 1930).

2. PHYSIOGRAPHICAL FEATURES OF THE COUNTRY

Tripolitania is a large expanse of land in the centre of North Africa, some 1100 kms. from north to south and 1000 kms. from east to west.

Of this area, only the coastal strip, a tract up to 200 kms. wide in the west and narrowing towards the east, is capable of extensive cultivation; the remainder is a little-known expanse of uncultivated land, the Hammada el Hamra, extending southwards through the Fezzan into the Sahara Desert.

The coastal strip falls into two natural divisions (see Fig. 1). First, a coastal plain consisting of steppe (the Gefara), up to 120 kms. wide in the west, and tapering to a point at Homs in the east, with extensive cultivation in the northern and eastern parts; the coastal plain has large areas of sand-dunes, where extensive reclamation of ground for agriculture is in operation. Second, an elevated plateau (the Gebel), which rises steeply to a height of over 700 metres in parts from the southern border of the steppe. The escarpment extends westwards into Tunisia, and curves northwards almost to the coast at each end and thus forms an arc-shaped wall enclosing the coastal plain; it is highly cultivated in parts, and it is over this wall that most of the invading locusts appear from the south, southwest and west.

This survey is concerned with the coastal plain and to a lesser extent the Gebel, for it is only there that locusts exist or have been studied to any extent, and are of economic importance.

3. AN ACCOUNT OF THE EGG-LAYING SITES

(a) Their general character

Those grounds visited may be said to conform with the usual requirements of the Desert Locust; the soil was invariably sand, dark or pale red in colour; usually firm, but often soft and loose; usually moist but occasionally dry, and in these latter instances the eggs had suffered more or less mortality. There was as a rule, a considerable amount of vegetation, containing usually a variety of species; eggs were never found in bare dunes; although in some instances egg-laying sites extended to the margin of vegetated areas, they did not extent on to the dunes beyond.

(b) Details of individual sites

In the following account of the sixteen sites studied, only the dominant plants are mentioned, but a complete list of the species identified and their relative abundance, is given in Table I. Plates I-IV illustrate the main variations in flora. To assist in identifying the locations of areas, six-figure map-references are given, which are taken from may 1:200.000 Tripoli, Sheet 2, compiled by 512 (A. Fd. Svy.) Coy., R.E. (Jan. 1942).

I. Ain Zara (L. 600590), (Plate I, 1).

15 kms. S.E. of Tripoli, near the Penitenziario. Ground undulating,

light reddish sand, quite moist at a depth of 2-3''. The vegetation was fairly thick in the patch of ground studied, and contained rather more trees and bushes than usual (*Acacia cyanophylla*, *Retama raetam*); dominant herbs were *Erodium triangulare*, *Ononis natrix* subsp. *falcata*, *Lotus creticus*, *Scabiosa leptopoda*, *Anthemis glareosa*, *Echiochilon fruticosum*, *Plantago* spp., and the small grass *Cutandia dichotoma;* the number of species (29) was particularly great in this area and many were strongly represented. Eggs were laid over an area of about 1 sq. km. on January 21st, and hoppers, the first to hatch this winter, appeared on March 13th.

II. Bianchi (L. 300470), (Plate I, 2).

30 kms. S.W. of Tripoli. Ground undulating, pale soft sand, moist at a depth of 2-3''. Ground vegetation fairly thick, but less so than in I, and there were scarcely any bushes and no trees. The dominant plants were *Carduus leptocladus* and *Centaurea sphaerocephala*, the latter having been heavily eaten in places by the ovipositing adults, obviously in preference to other plants. Other common plants were *Ononis natrix* subsp. *falcata*, *Anthemis glareosa*, *Artemisia glutinosa*, and *Rumex* spp. Some eggs had been laid on March 16th in small patches of barley cultivated locally, but the majority were outside these patches; they covered an area of approximately 10 sq. kms.

III. Near Castel Verde (L. 950470).

50 kms. E.S.E. of Tripoli. A small area of undulating, sandy ground with thick vegetation at the edge of wheat cultivation; *Carduus leptocladus* and *Picris coronopifolia* were the commonest plants. Eggs were laid on March 16th.

IV. Near Castel Verde (L. 950470).

A patch of wheat cultivation very close to III, in which adults were copulating on March 29th. A level area of loose, sandy soil; the commonest plants amongst the full-grown wheat were *Vicia* sp., *Picris coronopifolia*, and *Lolium multiflorum*.

V. Concessione Bova (L. 880480), (Plate I, 3).

44 kms. E.S.E. of Tripoli. Undulating, fairly firm pale sand, uncultivated, but close to cereal cultivation. The vegetation was not very thick, and mostly low-growing; *Ononis natrix* subsp. *falcata*, *Aristida pungens* and *Nolletia chrysocomoides* were dominant. Eggs were laid on February 10th, and hoppers emerged on March 28th.

VI. Castel Benito (L. 460490), (Plate I, 4).

21 kms. south of Tripoli. An undulating, hillocky area of rather dense

Acacia cyanophylla woodland, with a certain amount of ground vegetation including *Ononis serrata* and *Koeleria salzmanni* var. *cossoniana* as dominants; the shrub *Retama raetam* was also common. The soil was soft sand, and although the area abutted on bare dunes, no eggs were laid outside the vegetation. The site was ill-chosen, for soft sand drains quickly, and this, combined with the hillocky nature of the ground, would cause the more elevated areas to dry out to a considerable depth, with the result that egg pods were laid bare by wind erosion in many places (see Plate III, 11), and it is estimated that 90 % of the eggs perished. In some places the erosion was so great that the egg-pods lay free on the surface of the ground. Oviposition occurred from February 6th onwards, over quite a long period.

VII. Azizia (L. 380300), (Plate II, 5).

41 kms. S.S.W. of Tripoli. A rather flat area under barley cultivation. Soil soft and sandy, and mainly dry, but with moist hollows. *Zizyphus lotus* grew on scattered hillocks (see Plate II). Many weeds, of which the commonest were *Centaurea sphaerocephala* and *Asphodelus microcarpus* grew amongst the barley. Eggs were confined to the ground planted with barley (an exceptional case, to judge by the other sites studied), and to paths and tracks, but were local, and most healthy and abundant in hollows where the soil was moist. In other and drier places, the holes bored were generally empty, but where eggs were present, these had shrivelled and probably did not survive. Conditions in this site support the general conclusion that it is exceptional for eggs to be laid in tilled soil which is loose and liable to dry out.

VIII. Near Suani ben Adem (L. 370470).

25 kms. S.S.W. of Tripoli. This ground was divisible into three areas :

(A) under olive and almond cultivation, with much ground vegetation among which the dominants were *Carduus leptocladus*, *Picris coronopifolia*, *Ononis natrix* subsp. *falcata* and another sp., and *Koeleria salzmanni* var. *cossoniana ;*

(B) under barley cultivation, with patches in which the barley was thin and *Carduus leptocladus*, *Centaurea sphaerocephala*, *Rumex tingitanus* and *Anagallis coerulea* were common;

(C) an uncultivated ridge between the barley and a vineyard.

In area (B) eggs were found only where the barley was thin, and the soil more firm and moist; they were common on the uncultvated ridge (C), but absent from the vineyard where the soil had been well tilled and was soft and loose. In area (A) the presence or absence of trees appeared to make no difference to the location of eggs. Oviposition took place on April 3rd and 4th.

IX. Ain Zara (L. 600590).

Very close to I, but on the south side of the Penitenziario. Ground undulating, of rather firm sand. Much ground vegetation, but fewer trees than in I. *Picris coronopifolia* was dominant and *Vicia* sp., *Anthemis glareosa*, *Carduus leptocladus*, *Nolletia chrysocomoides*, and *Imperata cylindrica* var. *europea* were all common. Eggs were laid at about the same date as in I.

X. Concessione Scarona (L. 435485), (Plate II, 6).

Near Suani ben Adem, 23 kms. S.S.W. of Tripoli. A flat area under cultivation, with rather sandy soil, separated by a track from a well-tilled vineyard. The commonest weeds in the barley were *Anagallis caeruleum*, *Senecio coronopifolius*, *Rumex* spp., *Asphodelus microcarpus* and *Phalaris minor*. The track was bordered by *Eucalyptus* trees, and the commonest ground-plants were *Bromus rigidus* and *Carduus leptocladus*. Eggs were found in the barley and on the track, but not in the vineyard, where the soil was well cultivated and loose (compare VIII). Oviposition took place on March 13th, and hoppers hatched on April 8th.

XI. Concessione de Marche (L. 410530).

Near Suani ben Adem, 18 kms. S.S.W. of Tripoli. Ground undulating, firm and sandy, thickly wooded with *Acacia cyanophylla*. The most abundant ground plants were *Ononis serrata* and *Imperata cylindrica* var. *europea*; *Aristida pungens*, *Helianthemum Lippii*, *Retama raetam*, *Picris coronopifolia* and several other plants were also common. It provided a typical illustration of the recent fixation of sand-dunes through the agency of such plants as *Acacia*, *Retama* and *Imperata*, and resembled I and VI in its main characteristics. Eggs were laid on February 22nd, and hoppers hatched on April 8th.

XII. Sidi Musa (L. 450370), (Plate II, 7).

30 kms. south of Tripoli. An undulating area of firm sand, thinly vegetated and mainly devoid of trees. Barley and olive cultivation were near, but absent where the eggs were laid. *Ononis natrix* subsp. *falcata* and *Aristida pungens* were the dominant plants; *Ononis serrata*, *Picris coronopifolia* and *Scabiosa leptopoda* were common. Eggs were laid over 1 sq. km. on March 4th, and hoppers were reported on April 12th.

XIII. Miggi (L. 835122).

65 kms. S.E. of Tripoli. A sloping area of ground in process of reclamation. The ground had been partitioned off by barriers of dead grass

(first stage of reclamation). Cultivation had, in fact, begun, for Castor Oil trees (*Ricinus communis*) had been planted. The commonest ground plants were *Eruca sativa*, *Centaurea sphaerocephala*, and *Cutandia memphitica*. This site was in some way unsuitable, since although a swarm had copulated there, search on April 19th revealed no eggs and only some of the « froth » normally deposited on the top of egg-pods was found. Possibly the soil was too soft to encourage oviposition, although there was plenty of moisture under the surface; but it is probable that this was the result of rain which had fallen after the locusts had left.

XIV. Miggi (L. 810150), (Plate II, 8).

62 kms. S.E. of Tripoli. An area of unusually soft sand, in an early stage of reclamation. Almond trees (*Amygdalus communis*) had been planted; there was little ground vegetation, the commonest plants being *Cutandia memphitica* (dominant), *Matthiola kralikii*, *Pityranthus tortuosus* and *Senecio coronopifolius*. Eggs were laid on March 9th, when many tons of locusts were collected by hand. The soil was unusually soft for an egg-laying site, but it is noteworthy that no eggs were deposited in an adjacent vineyard, where the soil was well-tilled.

XV. Miggi (L. 800142), (Plate III, 9).

63 kms. S.E. of Tripoli. A sloping area of very firm, moist, sandy ground, and rather stony, as can be seen from the photograph; it was undergoing reclamation. The dominant plant was the small shrub *Scrophularia saharae;* several grasses and herbs were common and a few trees (*Acacia cyanophylla* and *Tamarix aphylla*) had been planted to assist reclamation. Eggs were laid on March 8th, and were almost ready to hatch when examined on April 19th.

XVI. Bir es Sidera (L. 720370), (Plate III, 10).

39 kms. S.E. of Tripoli. A large area of steeply undulating sand-dunes, fixed, apparently naturally, by *Aristida pungens*, which was distinctly dominant and grew chiefly on the tops of the mounds; another grass, *Koeleria salzmanni* var. *cossoniana*, grew abundantly in the sheltered hollows between the mounds. The sand was fairly firm. Eggs were laid on February 2nd, and hoppers emerged on March 30th.

(c) A general account of the vegetation

The vegetation was typical of that found in and around cultivated land in northern Tripolitania. Most of the plants were herbs or small shrubs, but in some of the areas concerned there were a few trees, such as *Acacia* *cyanophylla, Tamarix aphylla, Eucalyptus*, and, in the more cultivated parts, *Amygdalus communis* (Plate II, 8), *Olea europea* and *Ricinus communis*. Some of the egg-laying sites were in wooded country (I, VI, XI) where *Acacia cyanophylla* was dominant (Plate I, 1 and 4).

Ninety-one species and one variety of plants were identified in all, and these are listed in Table I. Three families of plants, Papilionaceae (18 spp.), Compositae (14 spp.) and Gramineae (13 spp. and one var.) predominate and include about half of the total number of species in the list. Of the remaining 27 families, two (Cruciferae and Scrophulariaceae) have four species and the rest, from one to three species. The representation of the families emphasises the herbaceous nature of the vegetation.

An attempt has been made in Table I to indicate the relative abundance of each species in the different egg-laying sites by a system of crosses; the status of a species in a particular site is shown as follows :

+ + + indicates that the species was very abundant or dominant.

+ + indicates that it was common, or abundant without being dominant.

+ indicates that it was present, but not common.

Where there is no cross, the plant was not observed.

On the right of the Table are two columns of figures indicating the status of each species in the sixteen sites; the first column shows the total number of sites in which each species occurred, but since some plants were found in only a limited number of sites but were abundant where they occurred, these figures do not provide a true picture; the second column, indicating « total abundance », shows the total number of crosses under all the sites in which the plant occurred, and these figures probably give a better gauge of the numerical status.

There is approximate agreement between the two sets of figures, since the first twelve species in order of « total abundance » include the only nine which were recorded from half and over of the sixteen egg-laying sites; these twelve species are given in Table II.

This list indicates the predominantly herbaceous nature of the characteristic plants. Out of the twelve species, eight are annuals, and of the four perennials, *Aristida pungens* (Plate IV, 17) is a grass, and *Ononis natrix* subsp. *falcata, Centaurea sphaerocephala* and *Artemisia glutinosa* (Plate IV, 19) are low-growing herbs. Out of the first twenty-seven species, in order of abundance, sixteen are annuals, seven are low-growing perennials, three are shrubs and one is a tree (*Acacia cyanophylla*, Plate I, 1 and 4); of the three shrubs, *Retama raetam* (Plate I, 3) is the only one which grows to any size, since the others (*Nolletia chrysocomoides* and *Echiochilon fruticosum*) do not normally grow taller than one or two feet.

In general, this predominantly herbaceous flora is typical of recently colonised ground such as sand-dunes in an early stage of reclamation. It is, of course, true that in other parts of Tripolitania, where there were no egg-laying sites, the majority of plants are low-growing, for trees are scarce except in a few well-watered tracts.

TABLE II.

SPECIES	TOTAL ABUNDANCE	NUMBER OF SITES IN WHICH RECORDED
Picris coronopifolia	17	9
Ononis natrix subsp. *falcata*	17	8
Aristida pungens	16	8
Carduus leptocladus	15	8
Centaurea sphaerocephala	14	8
Koeleria salzmanni var. *cossoniana*	13	8
Cutandia memphitica	12	7
Anthemis glareosa	11	8
Artemisia glutinosa	10	8
Senecio coronopifolius	10	8
Hordeum sp. (cultivated barley)	10	6
Rumex tingitanus	9	7

Picris coronopifolia (Plate IV, 14) and *Carduus leptocladus* were two very abundant annuals, the latter varying in stature from a few inches to three or four feet (Plate III, 12). *Anthemis glareosa* (Plate IV, 18), a very small annual, was also abundant and characteristic of sandy places; and so also was *Rumex tingitanus*, with its large and conspicuous pink or red fruiting perianth. Other important annuals deserve brief mention. *Ononis serrata* was abundant locally, and an unidentified, blue-flowered *Vicia* was common in most places; *Lotus creticus*, a small plant, was much eaten by hoppers on site I. *Erodium triangulare*, a straggling plant (Plate IV, 16) was also common on site I and eaten by hoppers. *Rumex bucephalophorus* was usually a small, inconspicuous plant of sandy soils, but varied in size considerably, as did *Carduus leptocladus*. *Medicago*, represented by at least three species, was very common on several sites, and showed a great tendency to become half-buried by drifting sands, so that only the turned-up tips of the branches protruded above the surface (Plate IV, 15). Of the three species of *Plantago*, *P. albicans* was the most widespread, but *P. psyllium* was also an important article of diet locally on site I.

The Gramineae include no less than six species which figure among the first twenty plants in order of abundance. *Aristida pungens* (Plate IV, 17), which comes third on the list, was exceedingly common on half of the egg-laying sites, and was, with *Imperata cylindrica* var. *europea* (Plate III, 13), characteristic of rather more firm, stable soils. *Koeleria salzmanni* var. *cossoniana* was scarcely less abundant on a greater variety of soils; *Cutandia memphitica* was locally common, and *Hordeum* (cultivated barley) and *Bromus rigidus* made up the remainder of the six commonest grasses.

The foregoing account includes the most important plants in the flora of egg-laying sites. One other species, *Asphodelus microcarpus*, was surprisingly rare (twice only) on the egg-laying sites, although it was locally characteristic of areas where reclamation was in progress.

(d) Unsuccessful choice of egg-laying sites

Two instances of patently unsuccessful choice of egg-laying grounds by swarms of locusts support observations which have been made before (di Cairano, 1933). Such as came to notice indicate that the consistency and moisture content of the soil are of primary importance.

The outstanding instance was on egg-laying site VI, where, in about 90 % of the egg-pods, the uppermost third of the egg mass was desiccated and shrivelled. This appeared to have been due to the eggs having been laid when the soil was suitably moist for their development, and to its having dried out more rapidly than usual owing to its comparatively loose and unstable consistency; the desiccation proceeded from the surface of the ground downwards, so that the upper parts of the egg-pods were first affected. If this was the true explanation, however, it is remarkable that the extent of the desiccation in each egg-pod was so consistent in different parts of the ground examined. In some parts of this area, the friable nature of the dried-out, sandy soil had allowed wind-erosion to remove the surface layer and expose the tops of the egg-pods (Plate III, 11); in one place erosion had uncovered the complete pods, so that they lay free on the surface, parched and destroyed. There had been rain previous to oviposition, so that the soil had then possibly been more moist than it was at the time of examination.

Preference for moist soil was illustrated also on site VII, an area of barley cultivation, where successful oviposition was mainly confined to depressions where there was more water-content: on higher and drier ground, egg-laying was only partly successful, for there were many empty holes, and in those where egg-laying was complete, most of the eggs were shrivelled and did not survive. There was no apparent difference between the higher ground and the depressions except in moisture content of the soil. The deduction from sites VI and VII is therefore that choice of site depends largely on moisture content at the time of oviposition, and that in some cases a positive selection may lead to disaster through subsequent desiccation. Failure to oviposit on site XIII indicates that consistency of the soil, as well as moisture content, may affect choice; in this instance, however, it is possible that the soil had been dry, as well as soft and unstable, when visited by a copulating swarm.

4. DISTRIBUTION OF EGG-LAYING SITES

A general idea of the distribution of egg-laying sites in the winter invasion of 1945-46 may be gained from that of hopper infestation (Fig. 1). This restriction to the area between and around Tripoli, El Azizia and Tarhuna, is remarkable since the area includes the chief tracts of cultivation, except the olive, fig and cereal cultivation on the Gebel around and betwen Jefren and Garian.

One might conclude from this that cultivation creates conditions favourable to oviposition, but a more particular survey of the area involved, brings to light further interesting details. Fig. 2 shows the locations of nearly all egg-laying areas recorded in the winter of 1945-46, in relation to cultivation. It can be seen that of the thirty-seven egg-laying sites, twenty-four are outside actual cultivation; of the remaining thirteen, nine are very near the edge; further, out of the total of thirty-seven, no less than twenty-four, or 65 %, are very near the edge of cultivation, whether just inside or just outside. This leads us to the deduction that it is the terrain round the edge of, or just outside, actual cultivation which is particularly favourable for egg-laying. The whole of the area concerned is at present under intensive reclamation, and this is naturally proceeding to the greatest extent on the ground immediately adjacent to that already under cultivation. The process of reclamation, therefore, rather than the subsequent cultivation, creates the favourable conditions. Reclamation is carried out chiefly in areas of sand-dunes, and the fixed sand-dune appears to be the ideal locality for oviposition in Tripolitania. The undulating, sandy terrain in many of the egg-laying sites studied had such an origin (e.g. grounds I, II, III, V, VI, VIII, IX, XI, XII, XIV, XVI).

The country around Tripoli was, until comparatively recently, characterised by sand-dunes; when the Italians began the work of reclamation after their conquest in 1912, it was estimated that there were over a hundred thousand hectares of land affected by shifting sand, and the roads between Tripoli and El Azizia, and round Castel Benito, were among the most affected. The work of sand-fixation was concentrated at these places, and it was there that many of the egg-laying sites of 1945-46 were found.

Dune-fixation has been effected mainly as follows (B.M.A., 1945). Wind-breaks consisting of low-growing sturdy plants such as *Imperata cylindrica*, *Aristida pungens* and *Artemisia* are first planted in a formation

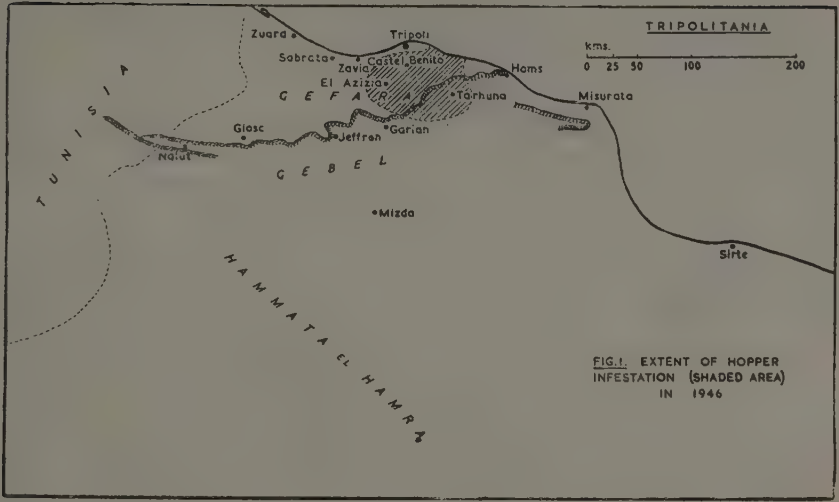
TRIPOLITANIA
kms.
0 25 50 100 200
Zuara
Tripoli
Sabrata
Zavia
Castel Benito
Homs
El Azizia
G E F A R A
Tarhuna
Misurata
Giosc
Jeffren
Garian
Nalut
G E B E L
T U N I S I A
Mizda
H A M M A T A EL H A M R A
Sirte
FIG.1. EXTENT OF HOPPER INFESTATION (SHADED AREA) IN 1946

Fig. 1

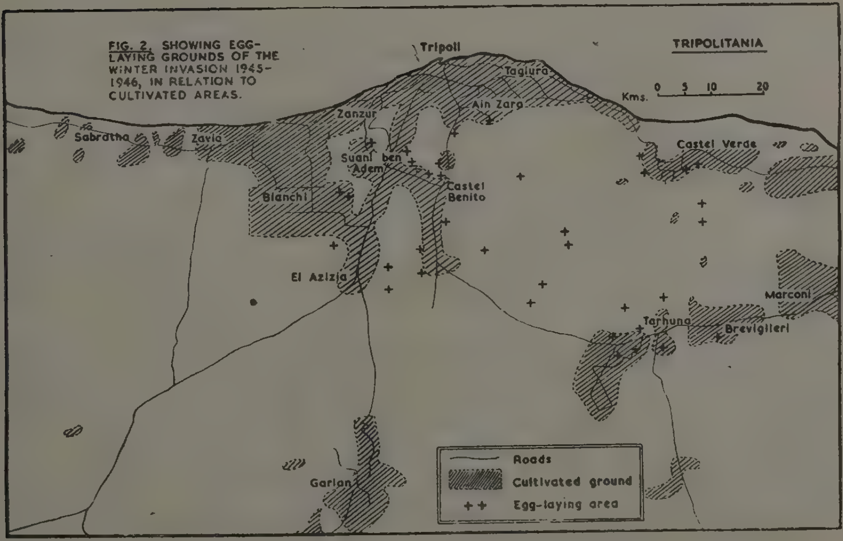
FIG. 2. SHOWING EGG-LAYING GROUNDS OF THE WINTER INVASION 1945-1946, IN RELATION TO CULTIVATED AREAS.
Tripoli
TRIPOLITANIA
Tagiura
Kms. 0 5 10 20
Zanzur
Ain Zara
Sabratha
Zavia
Castel Verde
Suani ben Adem
Castel Benito
Bianchi
El Azizia
Marconi
Tarhuna
Breviglieri
Garian
Roads
Cultivated ground
+ + Egg-laying area

Fig. 2

of squares to even and stabilise the distribution of drifting sand. When some measure of stabilisation has been achieved, seeds of several plants likely to establish themselves are scattered, such as *Ricinus communis*, *Retama ractam* and others. On ground dedicated to afforestation trees such as *Acacia cyanophylla*, *A. horrida*, *Tamarix aphylla*, *Cupressus* and *Pinus* are then planted. The prevalence of some of the above species in the flora of egg-laying sites (see Table I) reflects the history of these areas; this is further stressed by the prevalence of annuals and small perennial herbs (see Section III), which follow naturally once the dunes are fixed.

The conclusion that it is the fixed but uncultivated dune which is usually the more favourable for oviposition, is supported by the comparative rarity of egg-laying in actual cultivation. Of the sixteen sites studied, only in II, VII, VIII, X and XIV were eggs found in actual cultivation; and of these, in II all the eggs were in uncultivated ground except for one small patch of cereal; in VII oviposition in barley was a failure; in VIII only a few eggs were found in barley, the majority being in an uncultivated marginal bank and in ground planted with *Amygdalus* trees (where most of the soil and vegetation themselves were unchanged by cultivation); XIV was also an area of almond cultivation, but the soil was mainly untilled and had a light cover of weeds. The fact that in several sites (III, V, X, XII) eggs had been laid in uncultivated ground beside fields, which were carefully avoided, also supports this view.

Regarding the suitability of different types of cultivation, certain observations throw some light. Egg-laying in tree cultivation was successful where it occurred (in almond plantations), doubtless because the soil is scarcely tilled and resembles, in consistency and ground vegetation, that of the fixed but uncultivated dunes. Cereal cultivation does not offer such favourable conditions, since the ground, broken by tilling, dries out more quickly and the eggs are liable to perish (site VII). Vineyards are probably more thoroughly tilled than any other type of cultivation, and avoidance of these by locusts for oviposition appears to be practically complete, although it frequently happens that eggs are laid right up to the edge of a vineyard (sites VIII, X, XIV).

Although the effect of reclamation on the nature of the soil is doubtless of primary importance, one must not disregard the possibility of an indirect effect through the vegetation; it has already been pointed out that sand-fixation encourages small annuals and herbaceous plants, and these may well retain the attention of adults in these localities and encourage oviposition, just as they are an important item in the food of hoppers (see Section V); the curious instance of the concentration of eggs round plants of *Centaurea sphaerocephala*, an especially favoured food-plant, on site II, has already been mentioned.

Whatever the precise nature of the relation of sand-fixation may be to favourable conditions for oviposition, one gets the impression that the effect of thirty years or so of land reclamation has been to create such conditions in the area between and around Tripoli, El Azizia and Tarhuna, where the resulting hoppers are least wanted. It is unfortunate that there are so few historical data to support this view. Records of oviposition for the year 1944-45 approximate in distribution to those for 1945-46, with a few outlying ones in the south and south-west of the Gefara, and in the Jefren and Nalut areas on the Gebel; in 1944-45 they were also rather more widely spread; in both these years, however, the records refer to the spring invasion (the winter one having practically failed), and some of these eggs may have been laid at a time when much of the annual flora of the reclamation areas had already died down.

Few records are available for the previous invasion of 1928-32. There are some, however, for the years 1930 and 1932; the six records of egg-laying for 1930 are all in the Tripoli-El Azizia district and northern coastal strip; the same applies to fourteen out of the eighteen records for 1932, the remaining four being on the Gebel or further south. It appears, therefore, that egg-laying was mostly concentrated in reclamation areas even at this earlier date. Some remarks on egg-laying sites by di Cairano (1933), when discussing the 1932 invasion, appear, although lacking in detail, to fit these general conclusions; an approximate translation of his account is as follows : « The eggs are laid .... preferably in a locality with the soil slightly humid and loose, especially, therefore, in the bed of a stream, in cultivated soil and in areas between shifting sand-dunes and steppe. Much egg-laying nevertheless occurs also in soil of any nature, from lighter to more compact. I have observed a deposition of eggs which had occurred on a little hill near Nalut with the soil extremely hard and stony. Egg-laying occurs usually in open spaces ». The same author, when discussing the 1930 infestation, stated : « It was rare for locusts to alight on cultivated ground, the invaded localities being usually the steppe zones. According to observaions made in the Colony, the adults ate very little and only in the morning. Egg-laying took place generally in the strip of soil separating the dunes and steppe, where there exists a certain practically permanent degree of humidity, as well as sufficient vegetation. Eggs have also been observed on cultivated lands and on compact soils ». The two accounts suggest that in these plagues, the necessary environment for oviposition occurred between dunes and steppe, where soil conditions are found similar to those existing in reclaimed land where oviposition was most frequent in 1946.

There are no data for invasions earlier than these, so that the distribution of egg sites before land reclamation started, is not known.

It is realised, of course, that factors other than reclamation may have been instrumental in controlling the distribution of egg-laying, and one of these which is universally recognised as important is rainfall which creates the necessary moist condition of the soil. The distribution of the 1945-46 egg-laying does, in fact, show a considerable degree of agreement with that of the highest average rainfall, which extends in a belt from Tripoli and Tagiura to Tarhuna, thence a short distance south-westwards along the Gebel, and north-eastwards to the coast. But nearly half of the egg-laying occurred to the west of this belt in the El Azizia area, in the region of second highest rainfall. Thus, although the average rainfall appears to be important, the agreement between distribution of egg-laying and high average rainfall is less close than between egg-laying sites and reclamation areas bordering on cultivation.

5. OBSERVATIONS ON FOOD-PLANTS

The question of how far locusts exercise discrimination in their choice of food-plants is always controversial. The few observations made in Tripolitania in 1946 included here, indicate a definite preference for certain species of plants. Most of the observations were on first and second instar hoppers; a few populations contained the third instar also, and in one case the fourth stage; thus most of the hoppers studied were in the earlier instars which, in certain species of locust, exercise more selection in their feeding than do lates ones (Uvarov, 1928, p. 74). In the present records there did not appear to be any difference in food selection among the instars and so these are ignored in what follows. Published lists of food-plants often contains instance of mere occasional nibbling (Uvarov, 1928, p. 76), but the observations here recorded are on definite feeding on the plants concerned.

A list of the plants which were seen to be eaten, together with the number of occasions on which feeding was observed on individual sites, is given in Table III. The small number of sites concerned was due to the time of the visit, since these were the only ones in which hoppers had hatched. The « total records » of feeding give a rough indication of the popularity of each plant, with the reservation that only on site I was a significant number of observations made owing to its convenient situation and the early hatching of the hoppers.

The figures provide interesting data on the importance of different families of plants in the diet of hoppers. The Compositae head the list with eight species and eighteen records of feeding, followed by the Papilionaceae with six species and fourteen records; these are the two dominant families in the flora of the egg-laying sites. The fact that the records of feeding are in reverse order to the total number of species (18 in the Papilionaceae and 14 in the Compositae) may not be significant, but at least it is not due to the local representation of families on site I, where seven species of Papilionaceae and only five of Compositae were recorded. The most striking fact is the small representation of Gramineae (only two species and four records of feeding compared with a total of thirteen species and one variety recorded in the flora). This may suggest either that *Schistocerca gregaria* is by nature not a grass feeder, or that most of the available grasses were rather dry (especially perennials such as *Aristida pungens* and *Imperata cylindrica*), and would not provide the moisture which is as important to

TABLE III.

SPECIES	EGG-LAYING SITE						TOTAL RECORDS
	I	IX	X	XI	XII	XVI (NEAR)	
GERANIACEAE							
Erodium triangularre	5	—	—	—	—	—	5
ZYGOPHYLLACEAE							
Fagonia kahirina	—	—	—	—	—	1	1
PAPILIONACEAE							
Ononis reclinata	1	—	—	—	—	—	1
Medicago obscura var. *inermis*	1	1	—	—	—	—	2
Medicago litoralis	1	—	—	1	—	—	2
Medicago spec. indet.	2	—	—	—	—	—	2
Lotus creticus	3	1	—	—	—	—	4
Vicia spec. indet.	2	1	—	—	—	—	3
UMBELLIFERAE							
Daucus syrticus	2	—	—	—	—	—	2
COMPOSITAE							
Anthemis glareosa	2	1	—	—	—	—	3
Artemisia glutinosa	1	—	—	—	—	—	1
Senecio coronopifolius	1		1	1	1	—	4
Atractylis spec.	—	—	—	—	—	1	1
Carduus leptocladus	—	1	—	—	—	—	1
Centaurea sphaerocephala	2	—	—	—	—	1	3
Picris coronopifolia	3	1	—	—	—	—	4
Launea spec.	1	—	—	—	—	—	1
PLANTAGINACEAE							
Plantago albicans	3	—	—	—	—	1	4
Plantago psyllium	1	—	—	—	—	—	1
Plantago spec. indet.	2	—	—	—	—	—	2
POLYGONACEAE							
Rumex bucephalophorus	1	1	—	—	—	—	2
GRAMINEAE							
Cutandia dichotoma	3	—	—	—	—	—	3
Bromus rigidus	—	1	—	—	—	—	1

hoppers as is the nutritive component of the food. In the Plantaginaceae, on the other hand, all three species recorded in the flora were seen to be eaten, providing a total of seven records.

A more detailed analysis of individual sites is only possible in the case of site I, for reasons given above. The great variety of its flora, however, made it favourable for this purpose and selection is all the more significant. Out of thirty species of plants recorded (sixteen of which were common) nineteen were eaten. Those eaten most consistently were *Erodium triangulare* (five records), *Medicago* spp. (four records), *Lotus creticus* (three records), *Anthemis glareosa* (two records), *Centaurea sphaerocephala* (two records), *Plantago* spp. (six records), and *Cutandia dichotoma* (three records). All these were reasonably common, except *Plantago psyllium* which was very local, but eaten with avidity where present. Several other plants equally or more common, such as *Retama raetam*, *Ononis natrix* subsp. *falcata*, *Acacia cyanophylla*, *Scabiosa leptopoda*, *Echiochilon fruticosum* and *Rumex tingitanus*, were not seen to be attacked. The large number of feeding records for *Erodium triangulare* and *Picris coronopifolia* were doubtless partly due to their great abundance and consequent availability; in the latter species the flowers were eaten first. There was, however, no mistaking the definite attraction of *Medicago* spp., *Anthemis glareosa*, *Plantago* spp., *Cutandia dichotoma* and above all *Centaurea sphaerocephala*. The small size and high moisture content of the most favoured plants may be significant to the early stages of the hoppers.

As far as the other sites are concerned, there is not enough evidence to make generalisations, although additional data regarding individual species are provided. *Medicago* spp. and *Lotus creticus* were definitely high on the preference list, the leaves being nibbled off right down to ground level while other species received no attention; for example, on site XI although *Medicago litoralis* was scarce, it had been heavily attacked, while the abundant *Ononis serrata* was used only for resting purposes. *Anthemis glareosa* was also eaten with avidity where it was available; the flower-heads were especially attacked, first the white ray florets and then the yellow disc florets. *Centaurea sphaerocephala* was, where available, eaten more greedily than any other plant; on site II it had been eaten right down by ovipositing adults, and it was noticed that patches of eggs were frequently laid around heavily attacked plants; this suggests that a favourable food plant may cause a swarm to remain and oviposit in a particular locality.

Cutandia dichotoma, the only grass seen to be eaten to any extent, was found only on site I, where it was greatly favoured as an article of diet. This grass consists almost entirely of an inflorescence one or two inches long, and it was this that was attacked; the preference given to this grass as opposed to others was probably due to its small size and abundance, and the fact that it is an annual with a relatively high water content.

The high proportion of annuals (eighteen out of twenty-three) among the preferred food plants in Table II is a significant fact; the same remarks apply to them as to *Cutandia dichotoma* stated above and to such perennials as *Lotus creticus*, *Plantago albicans* and *Centaurea sphaerocephala* which are low-growing herbs.

Comparison of these observations with a long list of preferred food-plants recorded in Egypt (Ballard, Mistikawi and Zoheiry, 1932 : 56) is interesting. These authors give a list of forty-six plants, only five of which figure on the list of species identified from Tripolitania; these are *Retama raetam*, *Ononis natrix*, *O. serrata*, *Imperata cylindrica* and *Asphodelus tenuifolius*; none of these were seen to be attacked during the present study, although the first four were available to feeding hoppers on one or other of the grounds. The inference may be that these plants are eaten when others are scarce, but evidence is required on this point.

General conclusions, as far as they are possible, from the present study, are therefore as follows :

(I) Hoppers exercise a definite preference for certain species of food-plants.

(II) There is a marked preference on the part of young hoppers for low-growing, annual plants, with relatively high water-content.

(III) As far as families of plants are concerned, Compositae appear to form the most important component of the preferred food-plants in Tripolitania, followed by Papilionaceae; Plantaginaceae rank high in the order of preference, but are not sufficiently abundant to be important. Gramineae, except for a low-growing juicy annual (*Cutandia dichotoma*), are low in the order of preference.

(IV) As far as individual species of plants are concerned, the following are among the most favoured : *Medicago* spp., *Lotus creticus*, *Anthemis glareosa*, *Centaurea sphaerocephala*, *Plantago* spp., and *Cutandia dichotoma*. The large number of feeding records for *Erodium triangulare* and *Picris coronopifolia* are probably due to their high availability.

6. EFFECT OF HOPPER DISTRIBUTION ON CONTROL METHODS

Owing to the fact that egg-laying predominates on the edge of cultivation, the resulting hoppers are distributed in a somewhat awkward manner for normal methods of control. It is dangerous to postpone baiting operations until the later instars have formed large marching bands, since the hoppers may by then have done considerable damage to cultivation. Baiting therefore, has frequently to be carried out against early stages, and this introduces a difficulty, for the young hoppers often appear to prefer natural food to bait. The prevalence of small annual plants in the diet of young hoppers has already been mentioned (Section V), and their preference for natural food was noted by di Cairano (« it was observed that in the presence of natural food, the hoppers would not touch the bait »), and again on more than one occasion during the present work. Andrews (1946) also states : « at this stage (1st instar) the young hoppers preferred young green plants and only developed a great liking for bait when the groups commenced marching ».

This is by no means intended to imply that baiting is not a satisfactory method of control, but it does suggest that, under the local conditions, there is a need for a supplementary method for operation against young hoppers close to grain cultivation or amongst weeds in tree cultivation.

Since small herbs form the staple food of young hoppers, it seems reasonable to make use of this fact. With this in view, a preliminary experiment was carried out at Ain Zara (site I) on 5th April, 1946 ; on two small areas of ground (each about 500 sq. ms.) populated with 1st and 2nd instar hoppers, the vegetation was sprayed, one area with a 6 %, the other with a 2 % suspension of gammexane in water. Only certain low-growing plants (*Picris coronopifolia*, *Plantago psyllium*, *Plantago albicans* and *Cutandia dichotoma*), which hoppers were known to prefer, were sprayed. The next day it was estimated that there had been a 75 % kill with the 6 % suspension and 50 % where the 2 % suspension had been used, results which were far superior to those obtained with ordinary bait on neighbouring test plots. Dying hoppers were seen until April 11th. Thus, the poisoned vegetation remained effective for at least six days and the cumulative mortality over this period must have been very high.

It is realised that control on these lines might be expensive, but further research is needed to find the optimum concentration and the rate of application of gammexane, as well as the most economical and effective means of spraying. It would, however, only be necessary to employ this method on the occasions when bait is less suitable for reasons explained above.

7. SUMMARY

(I) An account is given of the vegetation and other features of sixteen egg-laying sites of *Schistocerca gregaria* Forsk. in northern Tripolitania, which were studied during the 1945-46 campaign. These are considered to be typical of the egg-laying sites in that country.

(II) Annual herbs predominate in the flora of these sites and are typical of recently colonised sand-dunes undergoing reclamation. The Papilionaceae, Compositae and Gramineae are the dominant families in the flora.

(III) Egg-laying sites are distributed mainly along the edge of cultivation, on fixed sand-dunes in process of reclamation rather than on cultivated ground. The operation of reclamation appears to create the conditions of soil and vegetation which are most favourable for oviposition. Thirty years of intensive reclamation may have resulted in the concentration of these conditions around cultivated tracts, so that when locusts invade the territory, they lay their eggs where the resulting hoppers may do most damage.

(IV) Observations on feeding indicate that hoppers exercise a marked selection of certain annual and perennial herbs which predominate in the egg-laying sites.

(V) The concentration of egg-laying round cultivation makes the control of hoppers difficult, particularly since young hoppers appear to feed on the annual plants in preference to bait. While baiting should remain the standard method of attack, it is suggested that control might be supplemented by spraying selected food plants with a suspension of gammexane in water.

8. ACKNOWLEDGMENTS

I would like finally to express my gratitude to those who have given me valuable assistance in this work; to the staff of the Anti-Locust Research Centre for providing historical data, references to literature and Dr. B. P. Uvarov, for making suggestions for its improvement; to Capt. S. L. E. Andrews, Locust Officer, and other personnel of the Department of Agriculture, British Military Administration, Tripolitania, for giving me every facility, and for providing data of egg-laying sites which I could not visit; and to Dr. B. L. Burtt of the Royal Botanic Gardens, Kew, for identifying the plants collected.

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TABLE I: The status of plants on egg-laying grounds

PLANT SPECIES	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	Total Number of localities found in	Total abundance (as expressed by sum of +'s under localities)
PAPAVERACEAE																		
Papaver sp. indet.	..	..	..	..	..	..	+	..	..	..	...	..	..	..	..	..	1	1
Hypecoum geslinii Coss. and Kralik.	..	..	..	..	..	..	+	..	..	..	..	+	..	..	..	..	2	2
FUMARIACEAE																		
Fumaria parviflora Lam.	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	1	1
CRUCIFERAE																		
Matthiola kralikii Pomel.	..	..	..	..	..	..	..	..	..	..	..	..	..	++	..	..	1	2
Malcolmia aegyptiaca Spreng.	..	..	..	..	..	..	..	..	+	..	..	..	+	+	..	..	3	3
Brassica tournefortii Gouan.	..	..	..	..	..	..	+	++	..	..	..	..	..	+	..	..	3	4
Eruca sativa Mill.	..	..	..	..	..	..	..	..	..	..	..	..	++	..	..	..	1	2
CISTACEAE																		
Helianthemum lippii (L.) Pers. sens. lat.	+	..	..	..	..	..	+	..	..	..	++	+	..	..	..	..	4	5
H. ruficomum (Viv.) Grosser.	..	..	..	..	..	.	+	..	..	..	..	..	..	..	..	..	1	1
CARYOPHYLLACEAE																		
Silene setacea Viv.	..	..	..	.	..	..	..	+	..	..	..	..	..	..	..	..	1	1
Silene sp. indet.	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	..	1	1
PARONYCHIACEAE																		
Loeflingia hispanica L.	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	1	1
Paronychia arabica DC.	..	..	..	..	..	..	..	..	+	..	+	..	..	..	..	..	2	2
TAMARICACEAE																		
Tamarix aphylla (L.) Lanza (*articulata* Vahl.). ...	..	..	..	..	..	+	..	..	..	..	..	..	..	..	+	..	2	2
GERANIACEAE																		
Erodium triangulare (Forsk.)	++	..	..	..	..	..	..	+	+	+	..	+	..	..	..	..	5	6
ZYGOPHYLLACEAE																		
Fagonia kahirina Bois.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
RHAMNACEAE																		
Ziziphus lotus Lam.	..	..	..	..	..	..	++	..	..	..	..	..	..	..	..	..	1	2
PAPILIONACEAE																		
Calycotome intermedia Presl.	+	+	..	..	..	..	..	..	..	..	..	..	..	.	..	..	2	2
Retama raetam Webb.	++	+	..	..	..	++	..	..	+	..	++	+	..	..	..	..	6	9
Genista saharae Coss. and Dur.	+	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1
Ononis natrix L. subsp. *falcata* (Viv.) Murb.	++	++	..	..	+++	..	+	+++	..	..	+	+++	..	..	++	..	8	17
O. reclinata L.	+	..	..	.	..	..	..	..	..	..	..	..	..	+	+	..	3	3
O. serrata Forsk.	..	..	..	..	..	+++	..	..	+	..	+++	++	..	..	..	..	4	9
Ononis sp. indet.	..	..	..	..	..	..	..	++	..	..	..	..	..	..	..	..	1	2
Medicago obscura Retz. var. *inermis* Urb.	..	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	1	1
M. litoralis Rohde.	..	..	..	..	..	+	..	..	..	..	+	..	..	..	..	..	2	2
Medicago sp. indet.	++	..	..	..	..	+	..	..	+	..	..	..	..	..	+	..	4	5
Trifolium tomentosum L.	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	1	1
Lotus creticus L.	++	++	..	..	..	..	..	..	+	..	..	..	+	..	+	..	5	7

TABLE I : The status of plants on egg-laying grounds *(continued)*

PLANT SPECIES	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	Total Number of localities found in	Total abundance (as expressed by sum of +'s under localities)
Lotus halophilus Boiss. and Sprun.?	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	1	1
Coronilla repanda (Poir.) Guss.	..	+	..	..	..	..	..	..	..	..	..	..	..	+	..	..	2	2
Hippocrepis bicontorta Lois.	..	..	..	..	..	..	..	..	+	..	..	+	..	..	++	..	3	4
Astragalus lanigerus Desf.	..	..	..	..	..	..	+	+	..	..	..	..	..	..	..	..	2	2
Hedysarum spinosissimum L.	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	1	1
Vicia sp. indet.	++	..	..	+	+	..	..	+	++	..	+	..	..	..	..	..	6	8
MIMOSACEAE																		
Acacia cyanophylla Lindl.	++	..	..	..	..	++	..	..	..	..	+++	..	..	..	+	..	4	8
ROSACEAE																		
Amygdalus communis L.	..	..	..	..	..	..	..	+	..	..	..	..	..	+	..	..	2	2
MYRTACEAE																		
Eucalyptus sp. indet.	..	..	..	..	..	..	..	..	..	+	..	..	..	..	..	..	1	1
UMBELLIFERAE																		
Pityranthus tortuosus (Desf.) Benth. and Hook.... ...	..	..	..	..	..	..	..	..	..	..	..	..	..	++	..	..	1	2
Daucus syrticus Murbeck	+	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	2	2
D. pumila (Gouan) Ball (*Orlaya maritima* Koch). ...	..	..	..	+	..	+	..	..	..	..	..	..	..	..	..	..	2	2
DIPSACACEAE																		
Scabiosa leptopoda Boiss.	++	..	..	..	..	..	..	..	..	..	..	++	..	..	..	..	2	4
COMPOSITAE																		
Helichrysum conglobatum Steud.	+	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	2	2
Ifloga spicata (Forsk.) Sch. Bip.	..	..	..	..	..	+	..	..	..	..	++	+	..	..	..	..	3	4
Anthemis glareosa Dur. and Barr.	++	++	..	+	..	+	..	+	++	..	..	+	+	..	..	..	8	11
Anacyclus alexandrinus Willd.	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	1	1
Artemisia glutinosa J. Gay.	+	++	..	..	..	+	+	..	+	+	..	+	..	..	++	..	8	10
Senecio coronopifolius Desf.	..	..	..	..	+	+	..	..	..	++	+	+	+	++	+	..	8	10
Echinops spinosus L.	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	..	1	1
Carduus leptocladus Durieu.	..	+++	++	+	..	+	..	+++	++	++	..	+	..	..	..	..	8	15
Centaurea sphaerocephala L.	++	+++	..	..	+	..	++	++	..	+	..	+	++	..	..	..	8	14
Leontodon (Kalbfussia) hispidulus (Del.) Boiss.	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	..	1	1
Picris coronopifolia (Desf.) DC.	++	++	++	+	+	..	..	++	+++	..	++	++	..	..	..	..	9	17
Hypochaeris salzmanniana DC (*arachnoidea* Poir.) ...	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	1	1
Launea sp. (? *residifolia* (L.) O. Kuntze).	..	..	..	+	..	..	+	..	+	..	..	..	..	+	..	+	5	5
Nolletia chrysocomoides (Desf.) Cass.	..	..	..	..	+++	..	..	..	++	..	+	+	+	..	+	..	6	9
PRIMULACEAE																		
Anagallis coerulea (Gouan) Schreb.	..	+	..	..	+	..	+	+	..	+	..	..	..	..	..	..	5	5
A. monelli L. subsp. *linifolia* (L.) Maire.	+	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	2	2
OLEACEAE																		
Olea europea L.	..	..	..	..	+	..	..	+	..	+	..	..	..	..	..	..	3	3
GENTIANACEAE																		
Centaurium pulchellum (Sw.) Druce.	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	1	1

TABLE I: The status of plants on egg-laying grounds *(continued and end)*

PLANT SPECIES	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	Total Number of localities found in	Total abundance (as expressed by sum of +'s under localities)
BORAGINACEAE																		
Echiochilon fruticosum Desf.	++	++	...	..	..	..	..	..	..	..	..	+	..	..	..	..	3	5
Alkanna tinctoria L.	+	..	..	..	..	..	..	..	.	..	..	..	+	..	..	..	2	2
SCROPHULARIACEAE																		
Linaria tenuis (Viv.) Spreng.	..	..	..	..	..	..	+	..	..	..	..	..	.	..	..	..	1	1
L. virgata L.	..	.	..	..	..	..	+	..	..	..	..	..	..	..	..	..	1	1
L. fruticosa Desf.	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	1	1
Scrophularia saharae Batt.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	+++	..	1	3
OROBANCHACEAE																		
Orobanche sp. indet.	..	..	..	..	..	..	..	..	..	..	..	..	..	+	..	..	1	1
PLANTAGINACEAE																		
Plantago albicans L.	++	..	+	..	..	..	..	..	+	+	..	..	..	..	..	..	4	5
P. psyllium L.	+	..	..	..	..	..	..	..	..	..	..	+	..	..	..	..	2	2
Plantago sp. indet.	++	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2
POLYGONACEAE																		
Rumex bucephalophorus L.	+	++	..	..	..	..	..	..	+	+	..	+	..	..	..	..	5	6
R. tingitanus L.	++	++	+	+	..	..	..	+	..	+	..	+	..	..	..	..	7	9
Polygonum equisetiforme Sibth. and Sm.	..	..	..	+	..	..	..	..	+	+	..	..	..	+	..	..	4	4
THYMELIACEAE																		
Thymelea microphylla Coss. and Dur.	+	..	..	..	..	..	..	..	..	..	..	.	..	.	..	..	1	1
URTICACEAE																		
Ricinus communis L.	..	..	..	...	..	..	..	+	..	..	..	..	++	..	..	..	2	3
LILIACEAE																		
Muscari cosmosum (L.) Mill.	..	..	..	..	..	..	+	..	..	+	..	..	..	..	..	..	2	2
Asphodelus microcarpus Viv. (*aestivus* Brot.)	..	..	..	..	..	..	++	..	..	+	..	..	..	..	..	..	2	3
A. tenuifolius Cav.	..	..	..	..	..	..	+	..	..	..	..	..	..	..	..	..	1	1
CYPERACEAE																		
Scirpus holoschoenus L.	..	..	..	..	..	..	..	..	+	..	..	..	..	..	..	..	1	1
GRAMINEAE																		
Imperata cylindrica var. *europea* (Anders.) Aschers. and Graebn.			..	..	..	..	..	++	++	..	+++	..	..	..	..	.	3	7
Phalaris minor Retz.	..	..	..	..	..	..	..	..	..	+	..	..	..	..	..	..	1	1
Aristida pungens Desv.	+	+	..	..	+++	++	..	..	..	..	++	+++	..	+	.	+++	8	16
Avena sp. (Wild oat)	..	..	+	..	..	..	..	+	..	+	..	..	..	..	..	..	3	3
Danthonia forskalii (Vahl.) R. Br.	..	..	..	..	..	..	..	..	..	..	..	+	..	..	..	..	1	1
Koeleria salzmanni Boiss. and Reut.	..	..	..	..	..	++	+	..	..	..	..	..	..	..	..	..	2	3
K. salzmanni var. *cossoniana* Domin.	..	..	..	..	..	..	..	++	+	..	++	+	+	+	++	+++	8	13
Cutandia memphitica (Spreng.) Benth.	..	..	..	..	..	..	+	..	..	..	++	+	++	+++	++	+	7	12
C. dichotoma (Forsk.) Batt. and Trab.	++	++	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	4
Bromus rigidus Roth.	+	..	++	..	..	..	..	++	+	++	..	+	..	..	..	..	6	9
B rubens L.	..	..	..	..	..	..	..	..	..	..	..	..	..	+	+	..	2	2
Triticum sp. (cultivated wheat).	..	..	..	+++	..	..	..	..	..	..	..	..	..	..	..	..	1	3
Lolium multiflorum Lam. var.	..	..	..	+	..	..	+	+	+	..	..	..	..	..	..	..	4	4
Hordeum sp. (cultivated barley).	..	+	..	+	+	..	+++	+	..	+++	..	..	..	..	..	..	6	10

Egg-laying sites of the Desert Locust in Tripolitania

E.S. Brown

Plate I

Fig. 1 : Site I

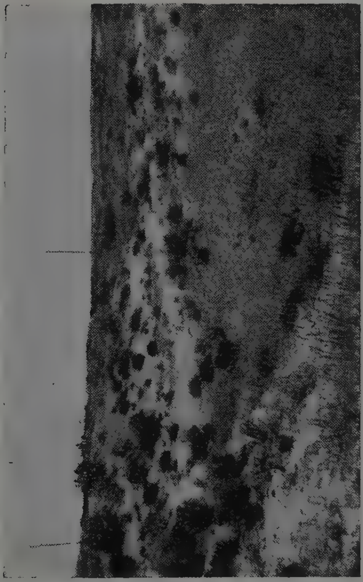

Fig. 2 : Site V

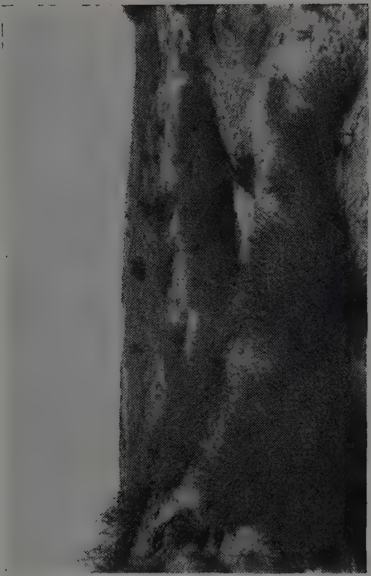

Fig. 3 : Site III

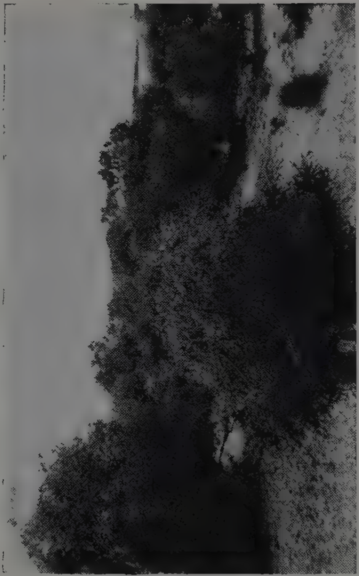

Fig. 4 : Site VI

Egg-laying sites of the Desert Locust in Tripolitania

E S. Brown

Plate II

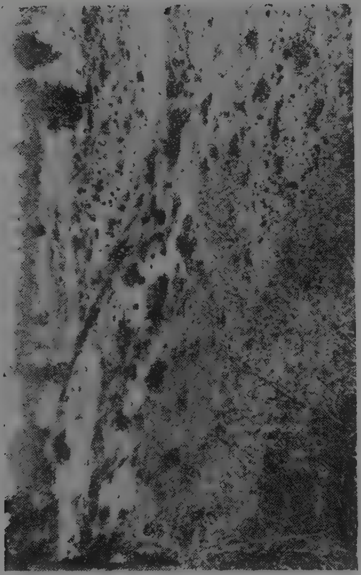

Fig. 7 : Site XII

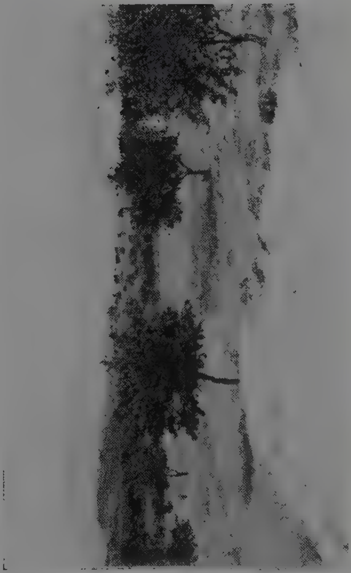

Fig. 8 : Site XIV

Fig. 5 : Site VII

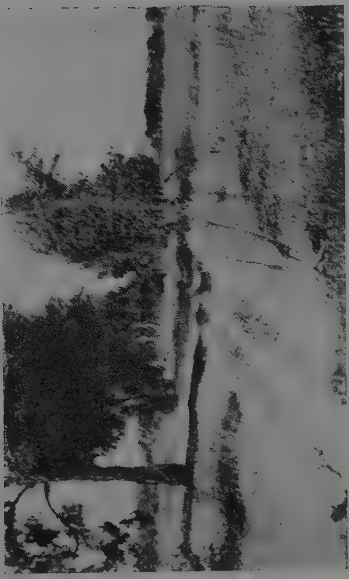

Fig. 6 : Site X

E.S. Brown

Plate III

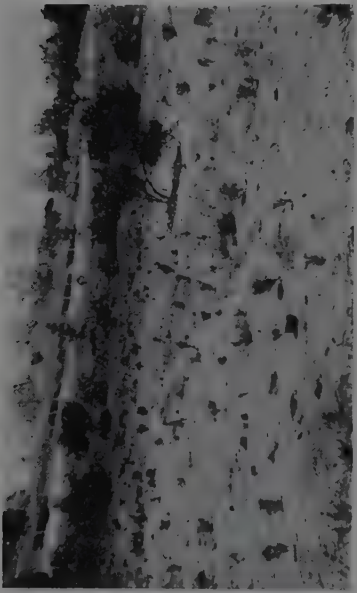

Fig. 9 : Site XV

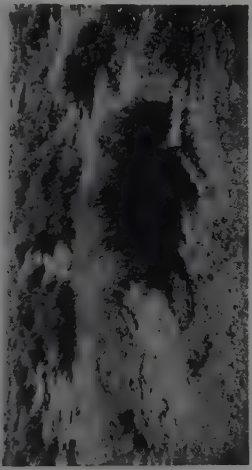

Fig. 10 : Site XVI

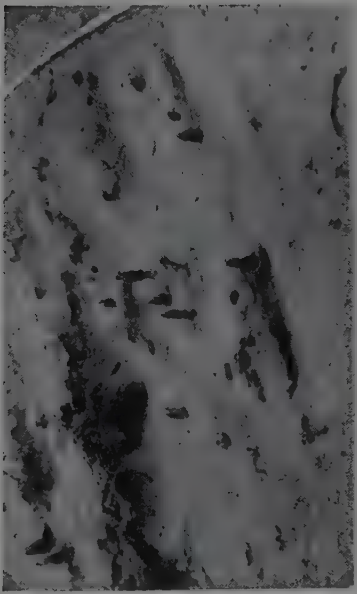

Fig. 11 : Egg-pods of *Schistocerca gregaria* exposed by wind

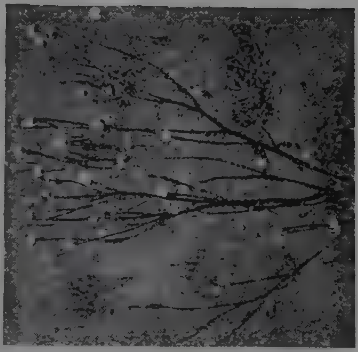

Fig. 12 · *Carduus leptocladus* Durieu

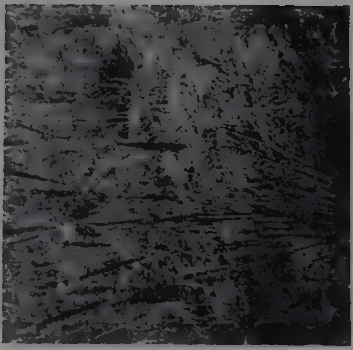

Fig. 13 : *Imperata cylindrica* var. *europea* (Anders.) Asch. and Graebn.

E.S. Brown

Plate IV

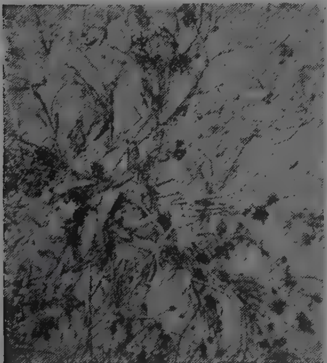

Fig. 14: *Picris coronopifolia* (Desf.) DC.

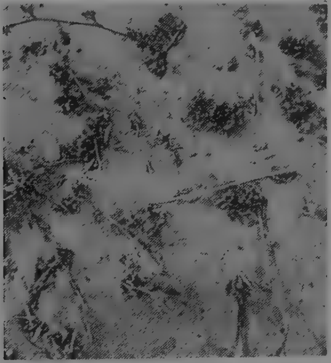

Fig. 15: *Medicago litoralis* Rohde.

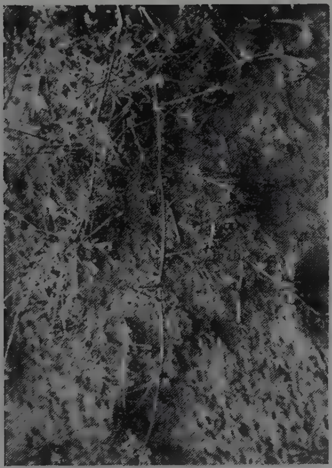

Fig. 16 : *Erodium triangulare* Forsk.

Fig. 17 : *Aristida pungens* Desv.

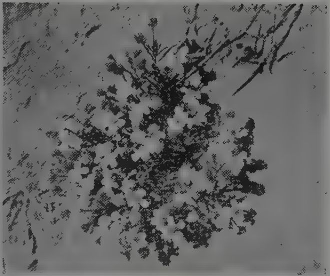

Fig. 18 : *Antemis glareosa* Dur. et Barr.

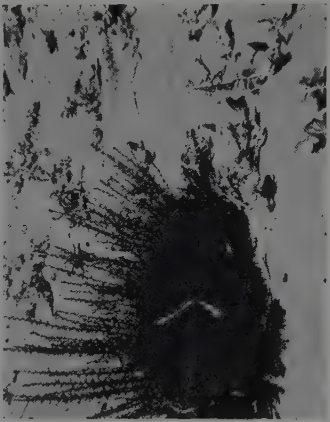

Fig. 19 : *Artemisia glutinosa* J. Gay (left), and *Centaurea sphaerocephala* L. (right).

R

Further Additions to the Dipterous Fauna of Dung in Egypt, with some Biological Observations (1)

by M. Hafez, M.Sc., Ph.D., F.R.E.S.,
Department of Entomology,
Faculty of Science, Fouad I University, Cairo.

In an earlier paper on the insect-fauna of dung in Egypt (Hafez, 1939), the present author recorded 30 species (belonging to 17 genera) of Diptera of which 21 species (belonging to 8 genera) breed in the dung and 9 species (belonging to 9 genera) visit the dung occasionally, not for breeding purposes. Since then more species have been collected. The following is a list of these flies arranged under heir respective families with brief remarks on the seasonal prevalence and breeding activity of some species. The list comprises 48 species (belonging to 31 genera) of which 20 species (belonging to 9 genera) were bred from dung and 28 species (belonging to 22 genera) were captured on it.

These flies were identified by Dr. F. Van Emden of the British Museum and Dr. J.E. Collin to whom I wish to express my sincere tanks. 8 species proved new to the British Museum and were added to its collection. These species will be marked by an asterisk *. Further specimens of some other species (marked by two asterisks **) are especially desired and will be appreciated by the British Museum.

FLIES REARED FROM THE DUNG

Family Sepsidae

Saltelliseps niveipennis Beck., *Saltelliseps niveipennis* Beck. var. *robusta* Duda, **Sepsis fissa* Beck., *Sepsis thoracica* R.D., **Sepsis thoracica* R.D. var. *consanguinea* Villen., *Sepsis lateralis* Wied., **Sepsis fragilis* Beck., and **Lasiosepsis hirtipes* Beck.

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(1) This paper was communicated by the author from Cambridge (England) where he is continuing his investigations on the ecology and physiology of flies.

Bull. Soc. Fouad Ier Entom., XXXI, 1947. [307].

These insects emerged from cow, buffalo and pig dung, most plentiful from cow dung. Freshly deposited dung attracts these insects in huge numbers. Male and females are commonly seen in copula on the dung. In some cases they form small swarms on the dung moving briskly about and swinging their wings and abdomens. The breeding season seems to be from April to October. Hammer (1941) recorded 9 species of Sepsids from cow droppings.

Family Borboridae

Leptocera (=*Limosina*) *curvinervis* Stnh. (=*roralis* Rond.), *Leptocera vagans* var. *rufa* Duda, *Leptocera fuscipennis* Hal., *Leptocera puerula* Rond., and *Leptocera* (*Elachisoma*) *nigerrima* Hal.

These species emerged from horse manure in huge numbers. In fact they are the most dominant member of the insect fauna of dung. Fresh and one day old droppings furnish great numbers of both sexes, seen on the surface and inside the dung. They are commonly found throughout the year, but the breeding season seems to be the spring and autumn. No mating was observed on the dung, most probably they do so on swarming. Several other species were recorded from cow dung (Hammer, 1941), from human excrement (Howard, 1900), and from the dung of various mammals (Richards, 1930).

Family Agromyzidae

**Agromyza* (*Domomyza*) *tuberculata* Beck., *Agromyza* (*Domomyza*) spec. (*nana*-group), and *Phytomyza atricornis* Meig.

These three species emerged from cow dung in two of the breeding experiments in May, two individuals of the first species, ten of the second species and three of the third species. They are very scarce. Other species (*Ceratomyza dorsalis* Loew and *Desmometopa latipes* Meig.) were from human excrement (Howard, 1900).

Family Muscidae (Anthomyidae)

Hylemyia spec., *Hylemyia* (*Paregle*) *cinerella* Fallen, and *Helina coniformis* Stein.

These flies emerged from cow and buffalo dung in June, *H. cinerella* is the most common of all, and is frequently met with in the spring and autumn. *H. strigosa* Fabr., *H. variata* Fall., *H. cinerella* Fall., *Paregle aestiva* Meigen and *Helina* spec. were recorded by Hammer (1941) on cow droppings.

Family Calliphoridae

Sarcophaga haemorhoidalis Meig.

Five flies emerged from cow dung and seventy-four from horse manure. *S. striata* was recorded from cow droppings (Hammer, 1941).

FLIES CAPTURED ON DUNG

Family Muscidae (including Anthomyidae)

Fannia canicularis L., *Limnophora notabilis* Stein, *Gymnodia tonitrui canache* Walk., ** *Gymnodia flavescens* Stein, *Caricea attenuata* Stein, ** *Atherigona aberrans* Mall., ** *Atherigona quadripunctata* var. *minuta* Schnabl, *Atherigona laevigata* Loew, and *Musca (Eumusca) xanthomelas* Wied.

These species were captured in May and June on cow droppings 1 to 10 hours after deposition.

Family Calliphoridae

Chrysomyia marginalis Wied., *Chrysomyia albiceps* Wied., *Pollenia rudis* F., *Calliphora erythrocephala* Meig., *Ravinia striata* F., and ** *Setulia grisea* Meig.

The first four species were captured in April on fresh cow and pig dung, the fifth and sixth species on cow droppings in September.

Family Ephydridae

Ephydra macellaris Egg., *Gymnopa albipennis* Loew, and *Hydrellia griseola* Flln.

These species were captured on cow dung in September and October. They are very scarce. Other species (*Scatella stagnalis* Fallen, *Discocernia parva* Loew, *Hydrellia formosa* Loew) were recorded from human excrement (Howard, 1900).

Family Drosophilidae

Drosophila ampelophila Loew, *Drosophila replita* Woll., and *Drosophila* spec.

All were captured on horse dung in June and July. *D. funebris* Meig., *D. busckii* Cog. and *D. ampelophila* Loew were recorded from human excrement (Howard, 1900).

Family Piophilidae

Piophila casei L.

It was captured on cow dung in April. It is rather scarce. The same species was recorded by Howard (1900) on human excrement.

Family Empididae

Cossopalpus aenescens Wied., and * *Tachydromia pictitarsis* Beck.

These two species are commonly met with on cow and horse dung in the spring and autumn. As these flies are known to be predaceous, it is very likely that they prey upon smaller Diptera (Poulton, 1906) like Sepsids and Borborids, etc.. These Empids usually appear on droppings shortly after deposition. *Tachydromia* spec. and *Rhamphomyia manca* Cog. were recorded from human excrement (Howard, 1900).

Family Dolichopodidae

* *Sciopus adumbratus* Beck.

Captured on cow dung in May. As the members of this family are known to be predaceous on minute insects, the association of this species with the rest of the insect fauna of dung may have something to do with their predaceous habit. Other species, namely *Diaphorus leucostomus* Loew and *D. sordalis* Loew, were bred from human excrement, and *Neurigonia tenuis* Loew was captured on it (Howard, 1900).

Family Phoridae

Megaselia scalaris Loew.

It was captured on cow droppings in May. Its occurrence is rather scarce. *Phora femorata* Meig. was recorded on human excrement (Howard, 1900).

Family Syrphidae

Eristalis aenea Scop.

It was captured on cow dung in April and May. Other species (*Rhingia campestris* Meig.) was recorded from cow droppings (Hammer, 1941) and *Syritta pipiens* L. from human excrement (Howard, 1900).

Family Sciomyzidae

* *Ditaenia brevipes* Lw. (=*grisescens* Meig.).

It was captured on fresh buffalo dung in September. It is very scarce on dung.

When classified according to the dung from which they were obtained the above records may be tabulated as follows:

(1) From cow dung

(a) Breeders

Family Sepsidae: *Saltelliseps niveipennis* Beck., *Saltelliseps niveipennis* var. *robusta* Duda, *Sepsis fissa* Beck., *Sepsis thoracica* R. D., *Sepsis thoracica* var. *consanguinea* Villen., *Sepsis lateralis* Wied., *Sepsis fragilis* Beck., and *Lasiosepsis hirtipes* Beck.

Family Agromyzidae: *Agromyza (Domomyza) tuberculata* Beck., *Agromyza (Domomyza)* spec. (*nana* group), and *Phytomyza atricornis* Meig.

Family Muscidae: *Hylemyia* spec., *Hylemyia (Paregle) cinerella* Fallen, and *Helina coniformis* Stein.

Family Calliphoridae: *Sarcophaga haemorhoidalis* Meig.

(b) Visitors

Family Muscidae (including Anthomyidae) : *Fannia canicularis* L., *Limnophora notabilis* Stein, *Gymnodia tonitrui canache* Walk., *Gymnodia flavescens* Stein, *Caricea attenuata* Stein, *Atherigona aberrans* Mall., *Atherigona quadripunctata* var. *minuta* Schnabl, *Atherigona laevigata* Loew, and *Musca* (*Eumusca*) *xanthomelas* Wied.

Family Calliphoridae: *Chrysomyia marginalis* Wied., *Chrysomyia albiceps* Wied., *Pollenia rudis* F., *Calliphora erythrocephala* Meig., *Ravinia striata* F., and *Setulia grisea* Meig.

Family Ephydridae : *Ephydra macellaris* Egg., *Gymnopa albipennis* Loew, and *Hydrellia griseola* Fallen.

Family Piophilidae : *Piophila casei* L.

Family Empididae : *Cossopalpus aenescens* Wied., and *Tachydromia pictitarsis* Beck.

Family Dolichopodidae : *Sciopus adumbratus* Beck.

Family Phoridae : *Megaselia scalaris* Loew.

Family Syrphidae : *Eristalis aenea* Scop.

Family Sciomyzidae : *Ditaenia brevipes* Lw. (=*grisescens* Meig.)

(2) From horse dung

(a) Breeders

Family Borboridae : *Leptocera* (=*Limosina*) *curvinervis* Stnh. (=*roralis* Rond.), *Leptocera vagans* var. *rufa* Duda, *Leptocera fuscipennis* Hal., *Leptocera puerula* Rond., and *Leptocera* (*Elachisoma*) *nigerrima* Hal.

(b) Visitors

Family Drosophilidae : *Drosophila ampelophila* Loew, *Drosophila replita* Woll., and *Drosophila* spec.

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Further tests on the use of Crude Benzene Hexachloride and DDT against Locusts and Grasshoppers

(with 3 Tables and 2 Graphs)

by Mohammed Hussein,
Senior Entomologist, Ministry of Agriculture, Egypt.

Results of preliminary tests, carried out by the Locusts and Grasshoppers organisation of the Egyptian Ministry of Agriculture with 666, were published last year (¹).

Work continued throughout 1947 both in the laboratory and in the field with benzene hexachloride and DDT preparations.

Materials tested and technique of work will be referred to in the following.

Tests on the toxicity of 666 to domestic animals by the Veterinary Section in collaboration with the Locusts Research organisation were continued and the effect of this compound on growing plants was studied.

LABORATORY TESTS

Material and Technique

The Desert Locust, *Schistocerca gregaria* Forskal, and the Grasshopper *Euprepocnemis plorans* Charp. were the main species treated.

All samples were kept for 24 hours before treatment in breeding cages and fed on either berseem (*Trifolium alexandrinum*), or maize leaves (*Zea mays*).

Baiting Experiments

The following insecticides were tested :

(a) « Gamtox », an American product containing, as claimed, 50 % benzene hexachloride, i.e. 6.5 % gamma insomer, and 50 % kaoline.

(b) « Geigy 33 », a Swiss preparation with 10 % DDT (dichloro-diphenyl-trichloroethane), and 90 % talcum.

(¹) See *Bull. Soc. Fouad I Entom.*, XXX, 1946, 155.

(c) 3 % Agrocide 7, a gammaxane preparation containing 20 % crude benzene hexachloride, i.e. 2.6 % gamma isomer, with 80 % gypsum.

(d) 3 % sodium arsenite containing 78 % arsenious trioxide were taken as a standard for comparison.

1000 insects were treated from May to September 1947.

Table I and Graph I illustrate the main results obtained which may be summarised as follows :

(a) 3 % Agrocide 7, containing 0.6 % crude benzene hexachloride may be taken as a standard dosage in baits for the control of adult *Euprepocnemis plorans* Charp.

(b) 1.2 % Gamtox, containing an equivalent amount of the effective ingredient as in Agrocide 7 gave higher mortality rate throughout the first eight hours of treatment.

(c) 0.75 % of Geigy 33 gave in no experiment 100 % kill even after the elapse of 72 hours.

(d) With 3 % sodium arsenite 100 % kill was obtanied in about one and half the time as with 3 % Agrocide 7 or 1.2 % Gamtox.

Dusting Tests

(a) Gamtox and Geigy 33 were tried and compared with Agrocide 7.

(b) 20 % Agrocide 7, 8 % Gamtox and 5 % Geigy 33 mixed with rock phosphate were tested. The latter two percentages contain approximately the same proportions of the active ingredient as in the first.

(c) For control, the insects were either dusted with rock phosphate or left treated and given green food.

(d) 1500 adult *Euprepocnemis plorans* Charp. were treated of which 500 were transferred 15 minutes after dusting to clean cages and the rest left in the treated environment.

From Tables II and III and Graph II the following points may be concluded :

(a) Mortality took place after a relatively shorter time among insects left in treated cages.

(b) 8 % Gamtox gave better results than 20 % Agrocide 7 during the early hours of treatment. The physical properties of this preparation i.e. fineness, specific gravity, etc., may be responsible for this.

(c) Geigy 33 was the least effective of the three compounds.

(d) One year old Agrocide 7 kept in the open seemed to have lost a good deal of its toxic effect, since only 75 % mortality was obtained after 72 hours.

(e) Percentage of mortality in control cages, where the insects were dusted with rock phosphate only, reached 35 % within 72 hours.

(f) The majority of the treated grasshoppers hardly attempted to feed.

TABLE I

Baiting experiments

on adult Euprepocnemis plorans Charp.

NUMBER OF TREATED INSECTS	PREPARATIONS USED		PERCENTAGE OF ACTIVE INGREDIENT	AVERAGE MORTALITY AFTER HOURS:							
	INSECTICIDE	PERCENTAGE		1	2	3	6	8	24	48	72
200	Agrocide 7	3	Gamma isomer 0.075	2	15	30	60	65	90	100	—
200	Gamtox	1.2	» » »	5	35	50	70	80	90	100	—
200	Geigy 33	0.75	DDT 0.075	0	0	0	0	3	13	35	45
200	Sodium arsenite	3	$As_2 O_3$ 2.34	0	0	0	0	30	60	95	100
100	CONTROL: fed on unpoisoned bran			0	0	0	0	0	0	10	30
100	CONTROL: fed on green maize			0	0	0	0	0	0	5	10

TABLE II

Dusting experiments

with Agrocide 7, Gamtox, Geigy 33, *and* old exposed Agrocide 7
on adult non-transferred Euprepocnemis plorans Charp.

NUMBER OF TREATED INSECTS	PREPARATIONS USED			PERCENTAGE OF ACTIVE COMPOUND	AVERAGE MORTALITY AFTER HOURS:							
	INSECTICIDE	CARRIER	PERCENTAGE		1	2	3	6	8	24	48	72
200	Agrocide 7	Rock phosphate	20	Gamma isomer 0.5	8	40	57	75	80	95	100	—
200	Gamtox	» »	8	» » »	7	45	75	85	90	98	100	—
200	Geigy 33	» »	5	DDT 0.5	0	0	10	10	15	20	30	50
200	Old Agrocide 7	» »	20	Gamma isomer ?	0	2	8	35	35	60	65	75
100	CONTROL: dusting with rock phosphate				0	0	0	0	0	20	30	35
100	CONTROL: fed on green maize				0	0	0	0	0	0	10	15

TABLE III

Dusting experiments

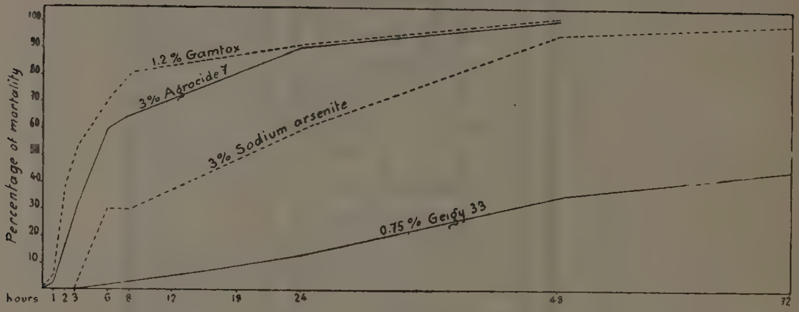
with Agrocid 7, Gamtox, *and* Geigy 33

on adults Euprepocnemis plorans Charp. *transferred after 15 minutes.*

NUMBER OF TREATED INSECTS	PREPARATIONS USED			PERCENTAGE OF ACTIVE COMPOUND	AVERAGE MORTALITY AFTER HOURS:							
	INSECTICIDE	CARRIER	PERCENTAGE		1	2	3	6		24	48	72
100	Agrocide 7	Rock phosphate	20	Gamma isomer 0.5	0	17	25	35	50	85	100	—
100	Gamtox	» »	8	» » »	0	15	30	30	50	80	100	—
100	Geigy 33	» »	2	DDT 0.5	0	0	0	0	0	35	40	50
100	CONTROL : dusting with rock phosphate				0	0	0	0	0	20	25	35
100	CONTROL : fed on green maize				0	0	0	0	0	0	10	15

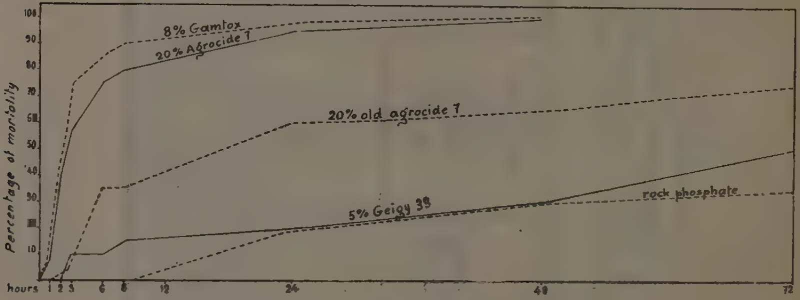
GRAPH I

Baiting Experiments



GRAPH II

Dusting Experiments



FIELD OBSERVATIONS AND EXPERIMENTS

(A) The Desert Locust

In the 1946 and 1947 locust campaigns in Arabia, the Egyptian Anti-Locust Unit operating in the Hedjaz used the grammaxane preparation Agrocide 7 at the rates 2 % and 3 %.

The main observations of the technical staff can be summarised in the following :

(1) The quick and high mortality rate. First kill was observed after 1-4 hours according to the insects' age, whihle 100 % mortality was general within 24 hours.

(2) The hoppers died in the open without endeavouring to find a shelter as with sodium arsenite bait. As a consequence bands of fresh hoppers fed on these dead individuals and soon met their fate.

(3) On one occasion, when 2 % and 3 % Agrocide 7, kept in sacks and left in the open air for about 9 months, were applied, percentage of mortality did not exceed 50-60 % after 24 hours while with fresh material stored in air-tight drums it ranged from 80-100 % at the same period.

(4) No complaints were received of any poisoning among domestic animals

(B) The Grasshopper Euprepocnemis plorans Charp.

(1) 23 field experiments were made in rice, clover, cotton, and maize plantations as well as in barren areas in the Northern provinces of Lower Egypt, where this species appears annually from May to November in varying numbers.

(2) Agrocide 7 was used in the form of bait, dust or spray and applied either by motors or hand machines.

(3) With 3 % in baits, mortality ranged between 50 and 90 % after 24 hours according to atmospheric conditions, time of application, kind and height of infested crops.

(4) A 10 % water suspension of Agrocide 7 ensured 100 % mortality after 24 hours, but the procedure proved to be expensive and slow.

(5) Dusting by motors or hand machines with 20 % Agrocide 7 and 80 % rock phosphate gave very promising results.

Mortality among samples collected by sweeping from the fields 15-30 minutes after treatment and kept in breeding cages with fresh food, reached from 80-100 % after 24 hours.

The process necessitated, however, a relatively big dose per acre (from 20-40 kilograms), according to the nature of the treated area, the growth and kind of vegetation, as well as the density of population and the distribution of the pest.

(6) The poison should actually come in contact with the body of the insect.

(7) Velocity, direction, and height of the prevailing winds played an important role in the dusting operations especially when applied by motors.

THE EFFECT OF GAMMEXANE ON PLANTS

Small plants grown in pots, various fruit trees as well as field crops were dusted or sprayed with Agrocide 7 in the proportions already referred to.

In rice fields inundated with water, and where dusting was applied, the plants began to wilt few days after treatment. This point is still under investigation.

THE EFFECT OF GAMMEXANE ON SOME DOMESTIC ANIMALS

This line of work as referred to in last year's bulletin, was continued by the Veterinary Section in cooperation with the Locusts organisation.

The main observations were as follows :

(a) Five goats were fed on a compound containing one part of barley and two of bran mixed with 5 % Agrocide 7.

Two of the animals died after 25 and 34 days respectively. Death was preceded by weakness and paralysis of the limbs.

As control a sixth animal was fed on barley and bran mixed at the same proportion.

(b) In the dusting tests three goats were given green maize and three others berseem. 20 pounds from each were dusted with 50 gramms of Agrocide 7 and given to each of the six treated animals. Two of them died after 6 and 32 days respectively.

(c) There was a general loss of weight among the treated animals

(d) The decrease in the milk yield was also noticeable even among the control goats due partly to captivity.

Work is still in progress and a full report will be published in due course.

BULLETIN

DE LA

SOCIÉTÉ FOUAD Ier D'ENTOMOLOGIE

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DU

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Expédition franco. — Payement d'avance.

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